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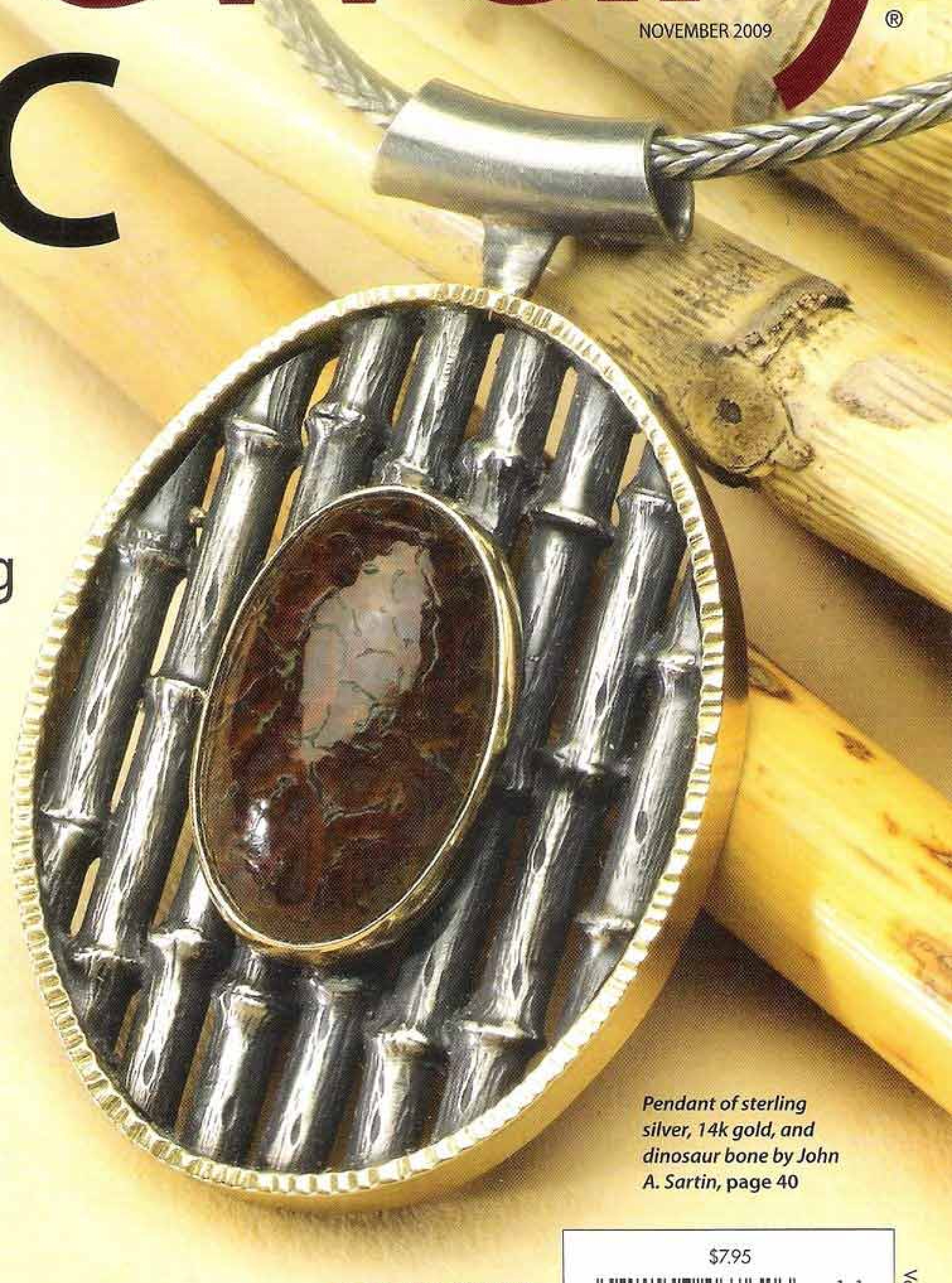

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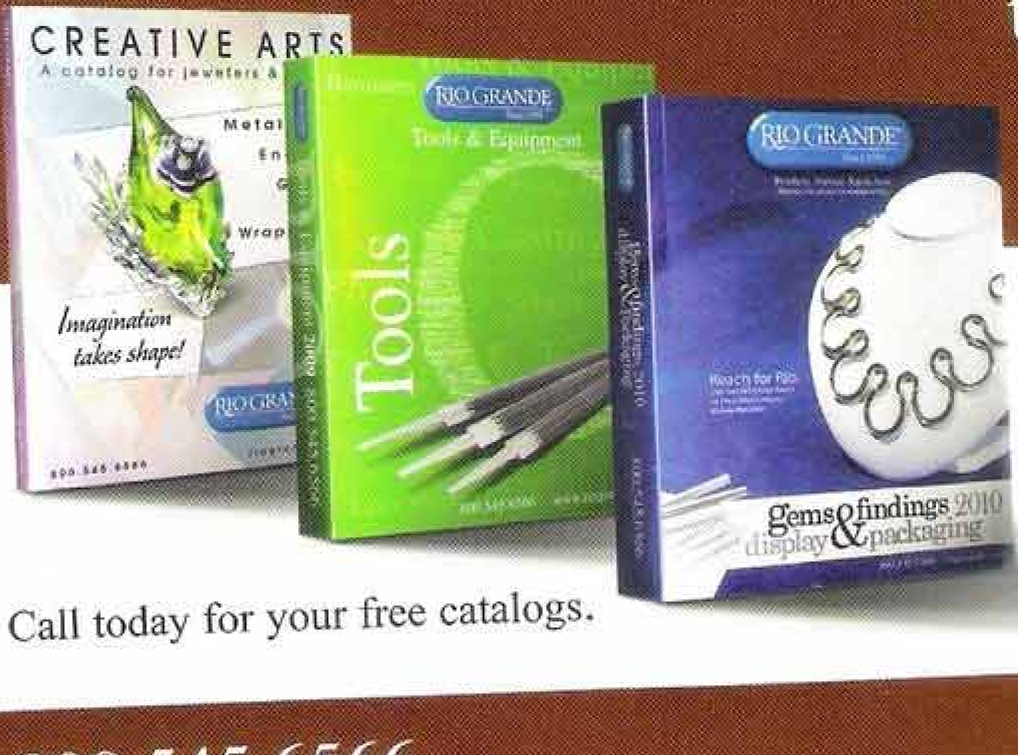
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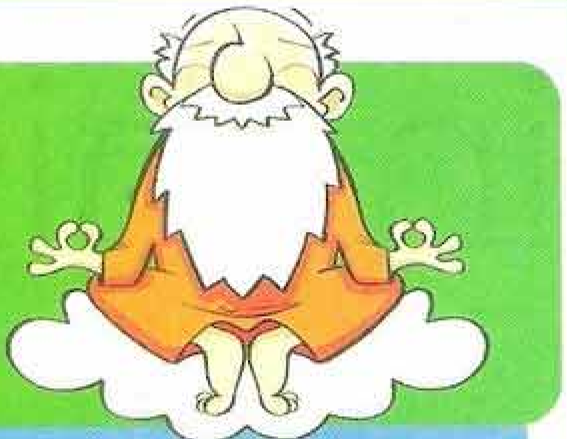

Get Enlightened * Get Educated * Get Creative * Get Started

Welcome to Metal Clay Guru

If you have found your way here, you must have a passion for metal clay, a thirst for knowledge and a craving for creative inspiration! Metal Clay Guru was created to provide a single source for metal clay artists to go to learn, become inspired and feel at home amongst their metal clay friends. Visit ***www.MetalClayGuru.com*** and you will find tips and tricks, articles, videos, projects, contests and galleries by some of the top metal clay artists in the world. Here are a few that you will find...

- Tim McCreight
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- Janice Donner
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- Jackie Truty
- Sherri Haab
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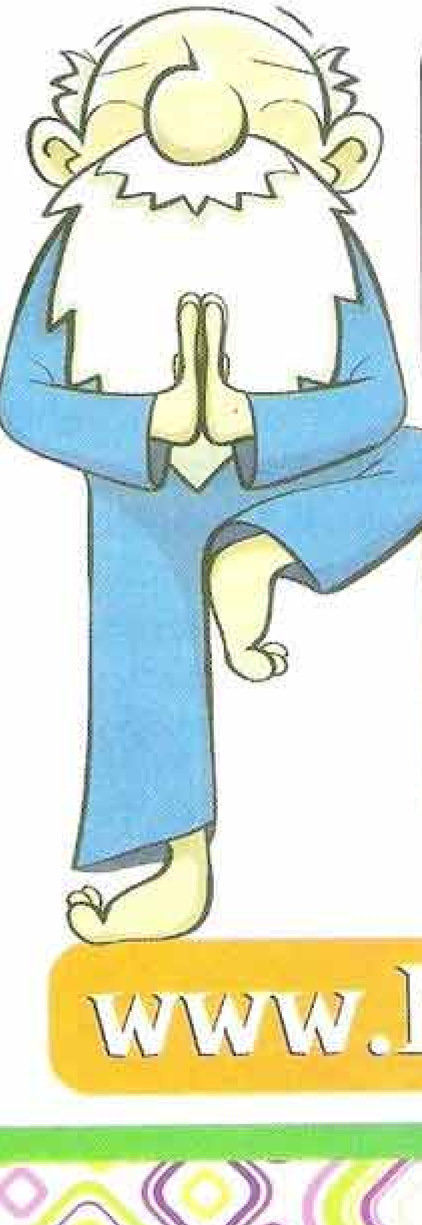

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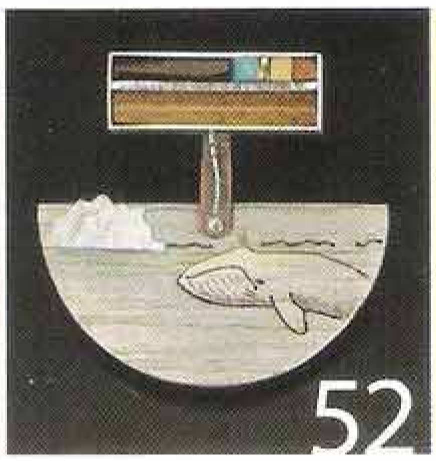
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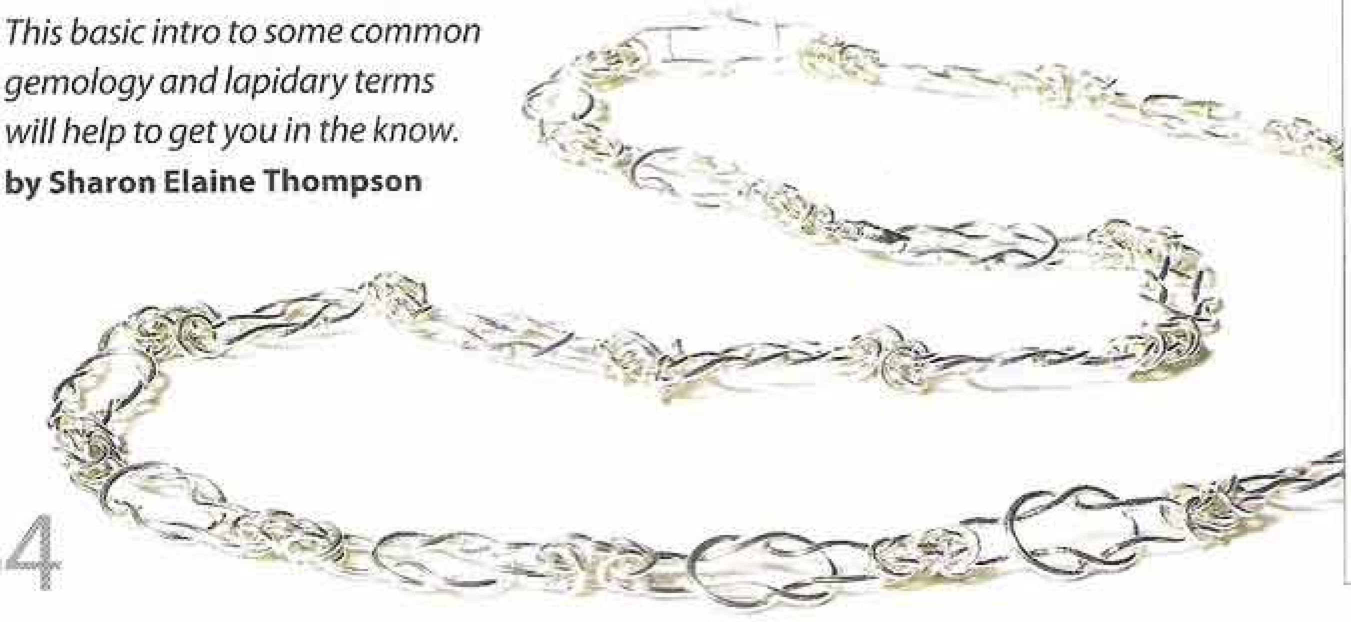
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Simple Saw-Cut Earrings

Turn flat metal sheet into dimensional earrings by making a single saw cut.

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from the editor | HAZEL WHEATON

Making a magazine — and making a magazine great — requires teamwork. The *Art Jewelry* team, left to right: Addie Kidd, Alison Mackey, Hazel Wheaton, Kristin Sutter, Jill Erickson, Linda Kast, Lisa Bergman, and Becky Markstein.

Now we are five!

Five years ago, *Art Jewelry* was the new kid on the block, a brand-new magazine making its debut. Now, *Art Jewelry* is the leading cross-media jewelry-making magazine. We got here through dedication, hard work, and the talents of a host of contributors, editors, and artists — and of course, the support of our readers.

As much as we love our magazine, there's always something we can do to make it better, and an anniversary is a good time to regroup and branch out. So, you'll notice some changes. Some are aesthetic, while others are more fundamental — such as three distinguished new columnists. Richard M. Shull will write our Stone Sense column; he'll give jewelry makers practical advice about using gemstones as well as information on stone sources. Michael David Sturlin is our new Metalsmithing 101 instructor. If you find yourself looking wistfully at the metalsmithing projects in *Art Jewelry* and wondering where to start, Michael will give you a solid foundation of technical know-how. And Christopher Darway will share tips and tricks gained from his years of experience and gleaned from his wealth of metal and metal clay knowledge in our new Studio Savvy column. These three join Marlene Richey, who will continue to provide her invaluable insight in her Business Savvy column each issue.

> An anniversary is a good time to regroup and branch out. So you'll notice some changes. Some are aesthetic, while others are more fundamental.

So, thank you to all the readers who have shared our first five years — may the next five years be as exciting and rewarding!

Hazel Wheaton

hwheaton@artjewelrymag.com

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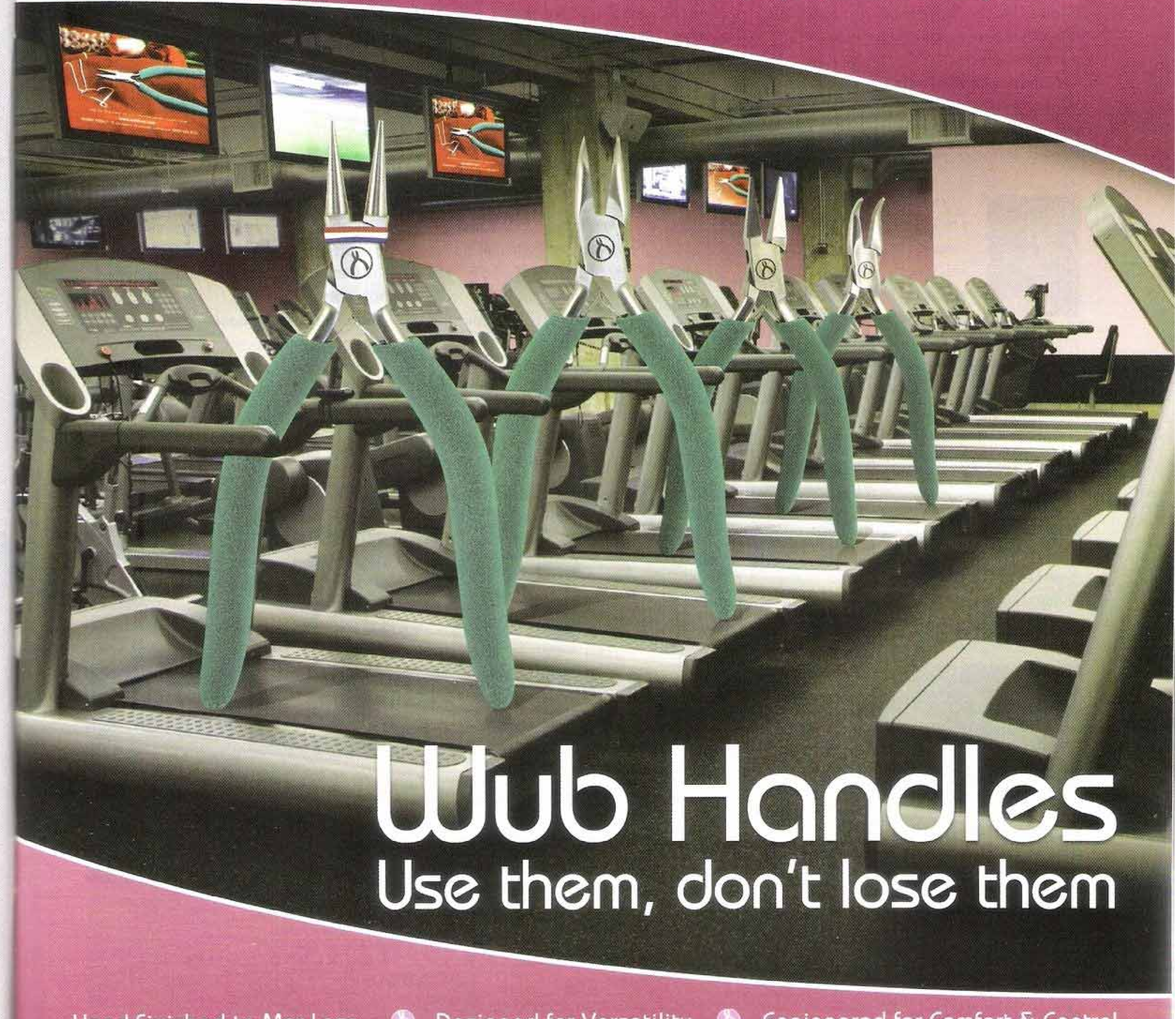
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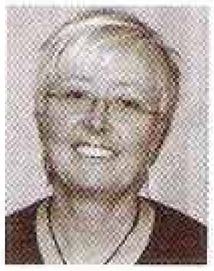
How has your work developed over the last five years?



"My work has become increasingly complex, and I fuss over the details a lot more. I love the engineering aspect of jewelry making — especially the challenge of constructing unique hollow forms. I also enjoy water etching and enameling my pieces, both of which require mindful preparation and a meticulous process."

—Catherine Davies Paetz

"Bronze and Copper Clay: Five Ways to Inlay," *page 69*

Contact: editor@artjewelrymag.com

"My work has evolved from a focus on metal to a passion for color. As an African-American jewelry artist and quilt maker, I am drawn to vivid colors and the way that they intermingle. After expanding my work to enamel jewelry, I found that what was missing was the reckless abandon I enjoy when quilting. When I discovered resin, I felt the same creative synergy with the material that I enjoyed with quilting. That process always begins with color and texture. What I like most about resin is that, in the end, my jewelry is as much inspired by chance as design."

—Velina A. Glass

"See the Other Side of Resin," *page 56*

Contact: www.velinaglass.com

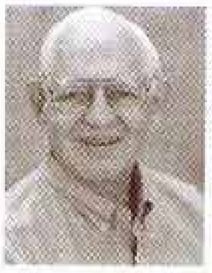
"My work has grown not only in quality but also in diversity. I try to bring out something fresh and different every year by using a different metal, technique, or, most recently, by cutting my own stones. I have to keep changing and adding to my work — I think it's AADD (adult attention deficit disorder), but I wouldn't have it any other way."

—John A. Sartin

"Shape Silver Tubing to Replicate Bamboo," *page 40*

"Cut Your Stone," *page 45*

Contact: www.johnsartindesigns.com



"My primary metalsmithing interest is in chain making. My greatest interest is in making fused fine-silver loop-in-loop and related chains. I also make jump ring chains of many different weaves. The changes in my chains over the past five years have been to introduce more texture (such as corrugation) as well as beads, pearls, and vintage jewelry accents to create pieces that are different and more interesting. I also like to make multi-strand chains."

—Howard Siegel

"Craft a Time-Honored Heracles Knot Chain," *page 64*

Contact: hjsiegel@swbell.net

"Five years ago, I was in the middle of a BFA program, and I was focused on painting, watercolor in particular. Then an instructor mentioned altered books, which fascinated me (being a writer). Later, she gave us an assignment to produce a three-edition handmade artist book. I loved it. As a result, my final project for my degree had nothing to do with watercolor, very little to do with painting, but everything to do with artist books. I shouldn't have been surprised to discover that 20-plus years of writing about jewelry and jewelry making had made a mark on my psyche: I ended up using metal and cold-connection techniques in some of the books!"

—Sharon Elaine Thompson

"Gemstone Terminology: 63 Essentials You Should Know," *page 78*

Contact: sharon.elaine.thompson@gmail.com AJ

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Ann Davis, *Midnight Swans*

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Our readers share their thoughts, questions, and tips.

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I am now a full-time RV-er and can't have a subscription, since we don't have a mail drop. I think that my subscription was what I loved getting in the mail most the past few years. Now I'm so unhappy not to be getting the things I read about in my newsletter. I would like to see an online subscription for us people that don't have a P.O. Box or formal address.

—Dorothy McKernan Doss
Lexington, Ga.

Article requests

I love working with sheet metal (especially silver, copper, and brass) but have much to learn, especially about removing scratches and preserving finishes and patinas on my jewelry. How about articles on how to protect and preserve patina, whether it's created by flame or chemical (specifically, what product, if any, to spray to coat)?

Also, I just bought a flex shaft, and I'm hoping I can learn how to remove scratches from bezel-setting or from soldering, etc. I'd appreciate an article that describes how to use various attachments to remove scratches and achieve satin and gloss finishes using the flex shaft. I haven't seen anyone actually remove scratches on small silver jewelry, for example.

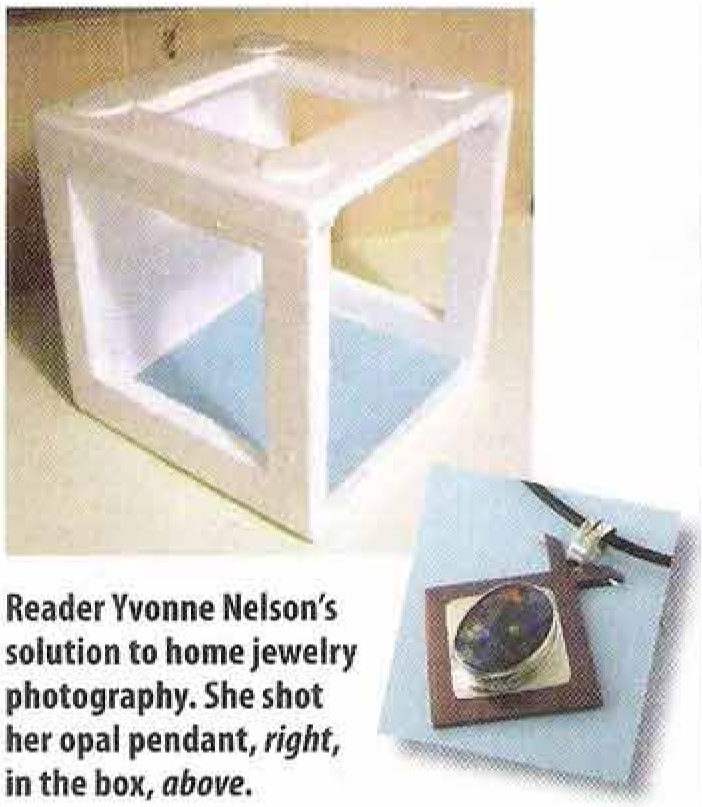
I hope these ideas aren't too basic for your audience. I've had little success using attachments correctly and effectively on my Dremel, and hand-sanding around curves and in small places is ruining my joints and makes more scratches. These ideas would also make wonderful videos.

—Cheryl Zettler
Bellevue, Wa.

DIY jewelry photography

In response to a letter published in Reader Forum [July 2009] from Caroline Paine in regard to tips on DIY jewelry photography, I have an affordable solution for her.

I use a white polystyrene (foam) box.



Reader Yvonne Nelson's solution to home jewelry photography. She shot her opal pendant, *right*, in the box, *above*.

You can pick one up for free from your local greengrocer. Cut a large hole out of the top and two sides (opposite each other). Dimensions of my box are 28 cm (11 in.) square; the cutouts are approximately 20 cm (8 in.) square. Place a piece of white or colored paper on the bottom to place your jewelry on. You can paste paper on the inside back of the box to hang up necklaces or earrings; stick to light colors, though, for best results.

Take the box outside, and take photos in natural light (a sunny day is preferable). I use a cheap Samsung camera and use either a tripod or image stabilizer (if your camera has this option) along with the macro function, which allows photographing images up close. Take the photos at an angle to avoid shadows and to minimize your own reflection in the jewelry. Be sure you turn off the flash.

When taking pictures indoors, I use three desk lamps fitted with natural light globes. Angle one lamp facing top down from above, and angle one facing in on each side. Drape a white sheet over the top of the box so that it hangs down over the sides, covering the cutouts. Again, angle your shots to avoid shadows and reflections.

—Yvonne Nelson
Australia, via e-mail

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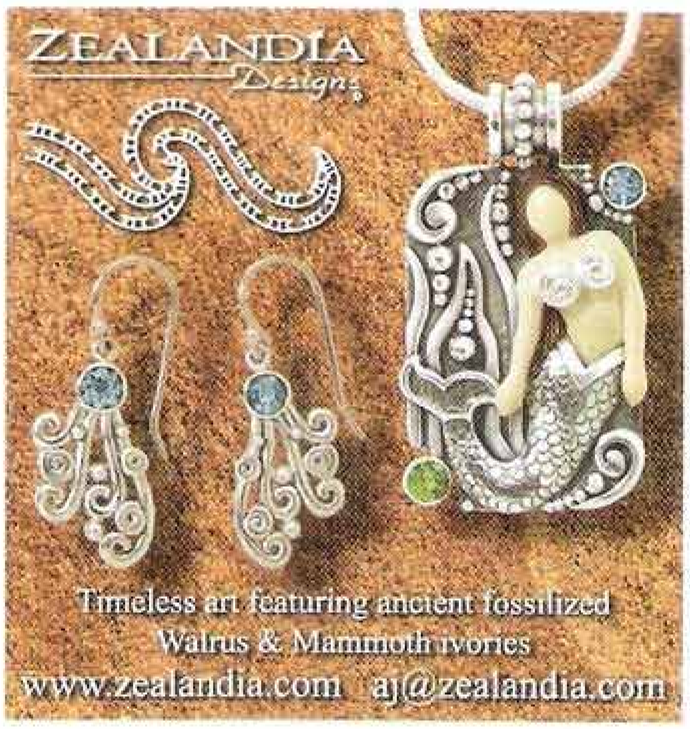
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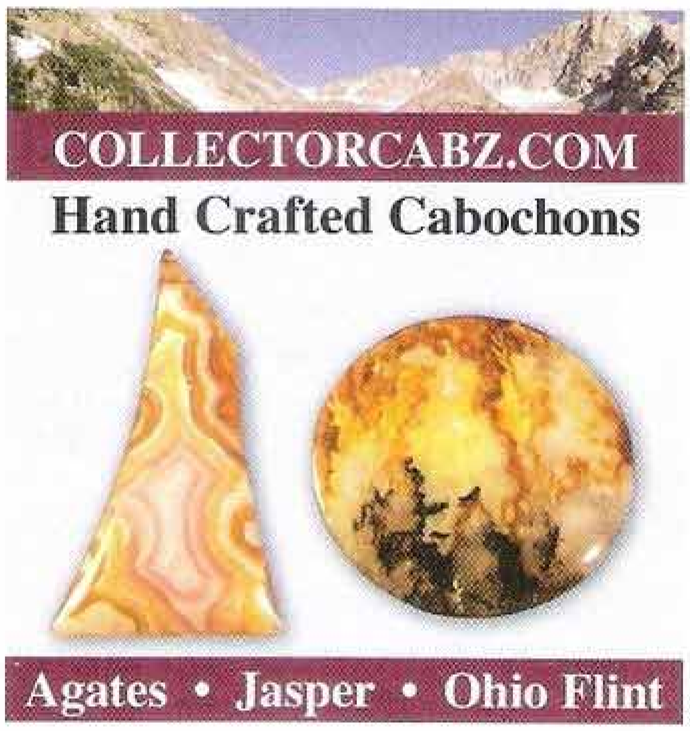
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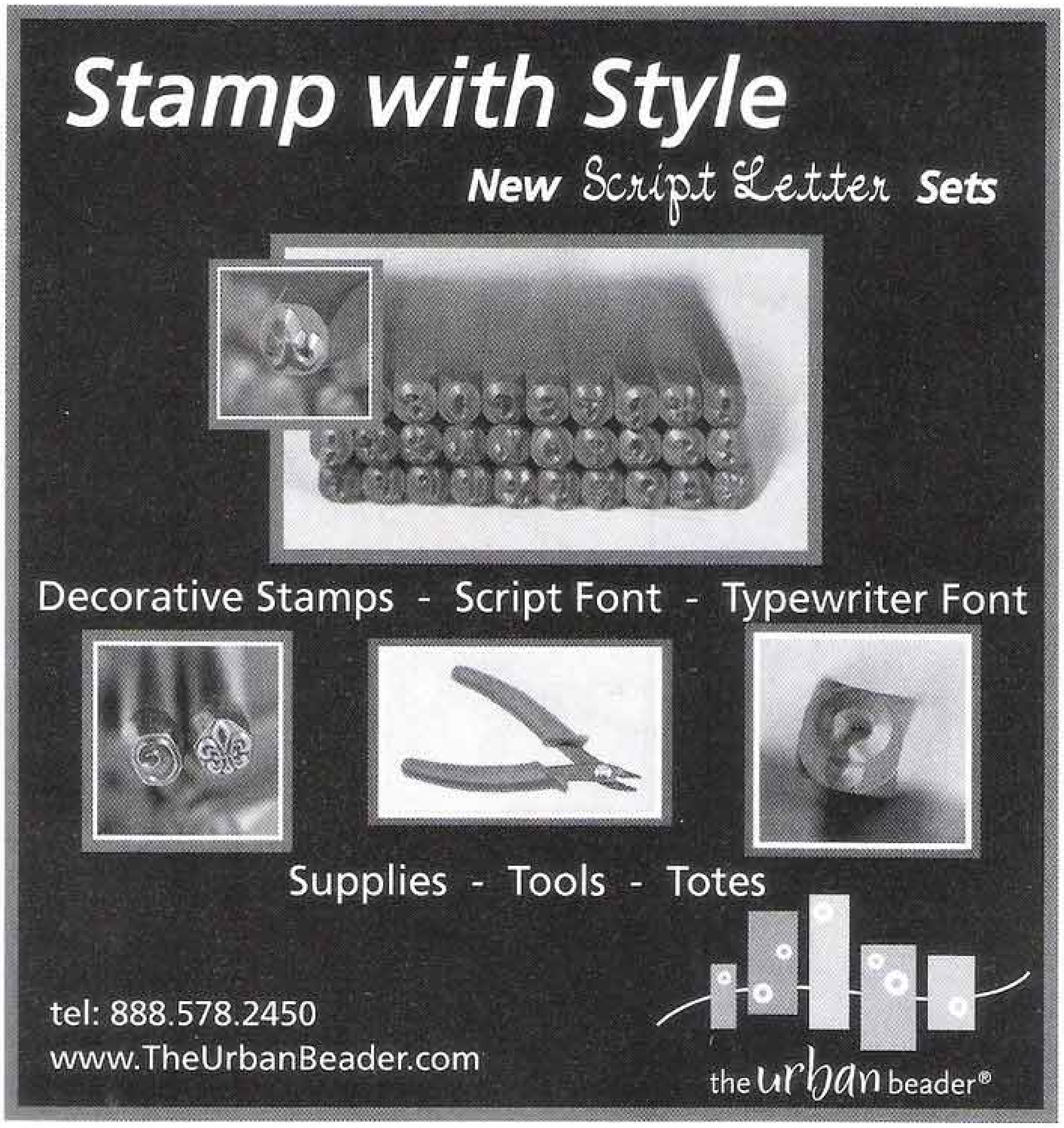
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exhibits

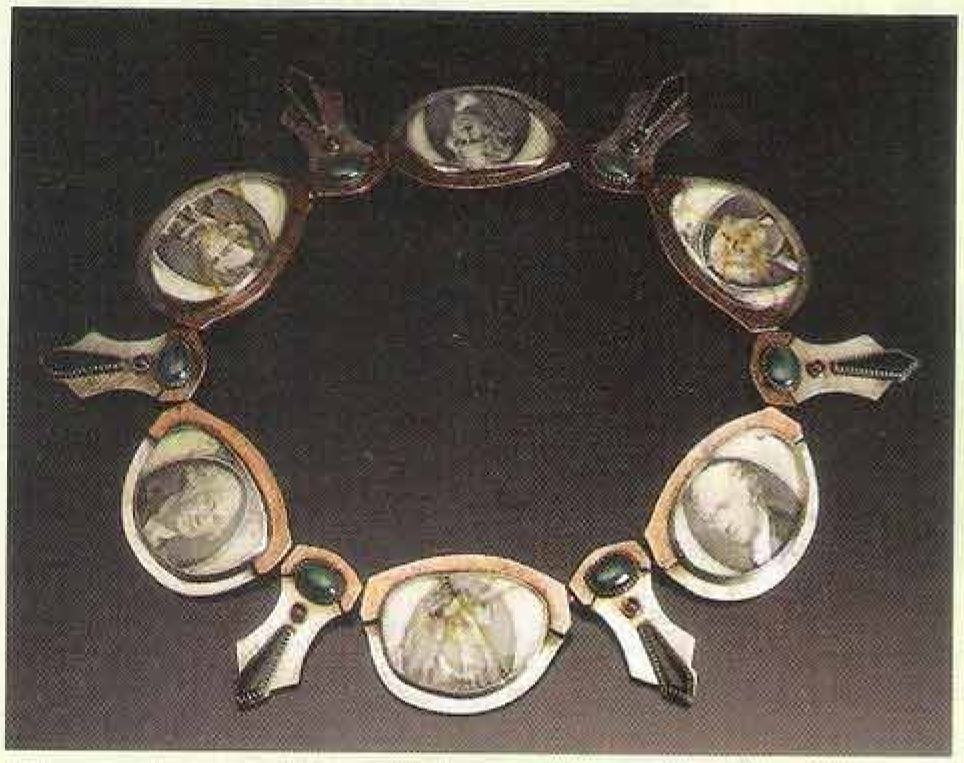
exhibit: *Loud Bones: The Jewelry of Nancy Worden*

What: Organized by the Tacoma Art Museum, the exhibit presents a wide range of work created by Nancy Worden over the last 35 years. Worden is a Seattle artist who creates intensely personal narrative jewelry that explores universal themes from a woman's perspective.

When: November 21, 2009–January 17, 2010

Where: Hallie Ford Museum of Art, Willamette University, Salem, Ore.

For more information: www.willamette.edu



▲ ***Broken Trust*** **necklace by Nancy Worden, 1992. Silver, copper, garnet, malachite, onyx, glass, currency. 19½ x 2 x ¼ in. (49.5 x 5.1 x .65 cm).** Photo by Doug Yaple.

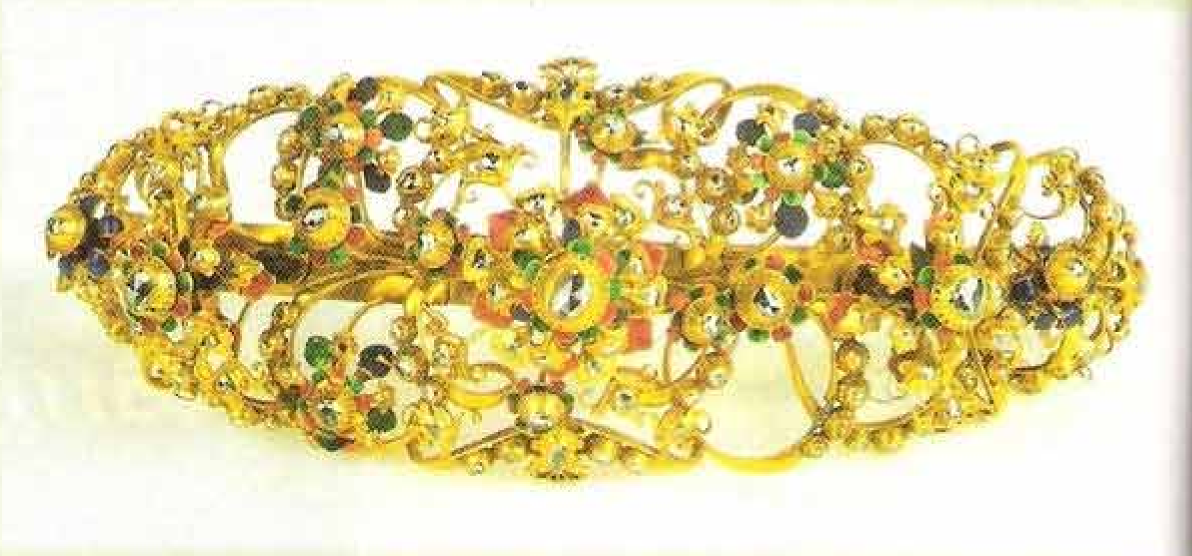
exhibit: *The Nature of Diamonds*

What: An overview exhibit of the dual nature of diamonds, from the glittering decorative pieces from designers like Tiffany & Co. to the diamonds used for industrial purposes. Nearly 800 items are on display, including an array of breathtaking gems.

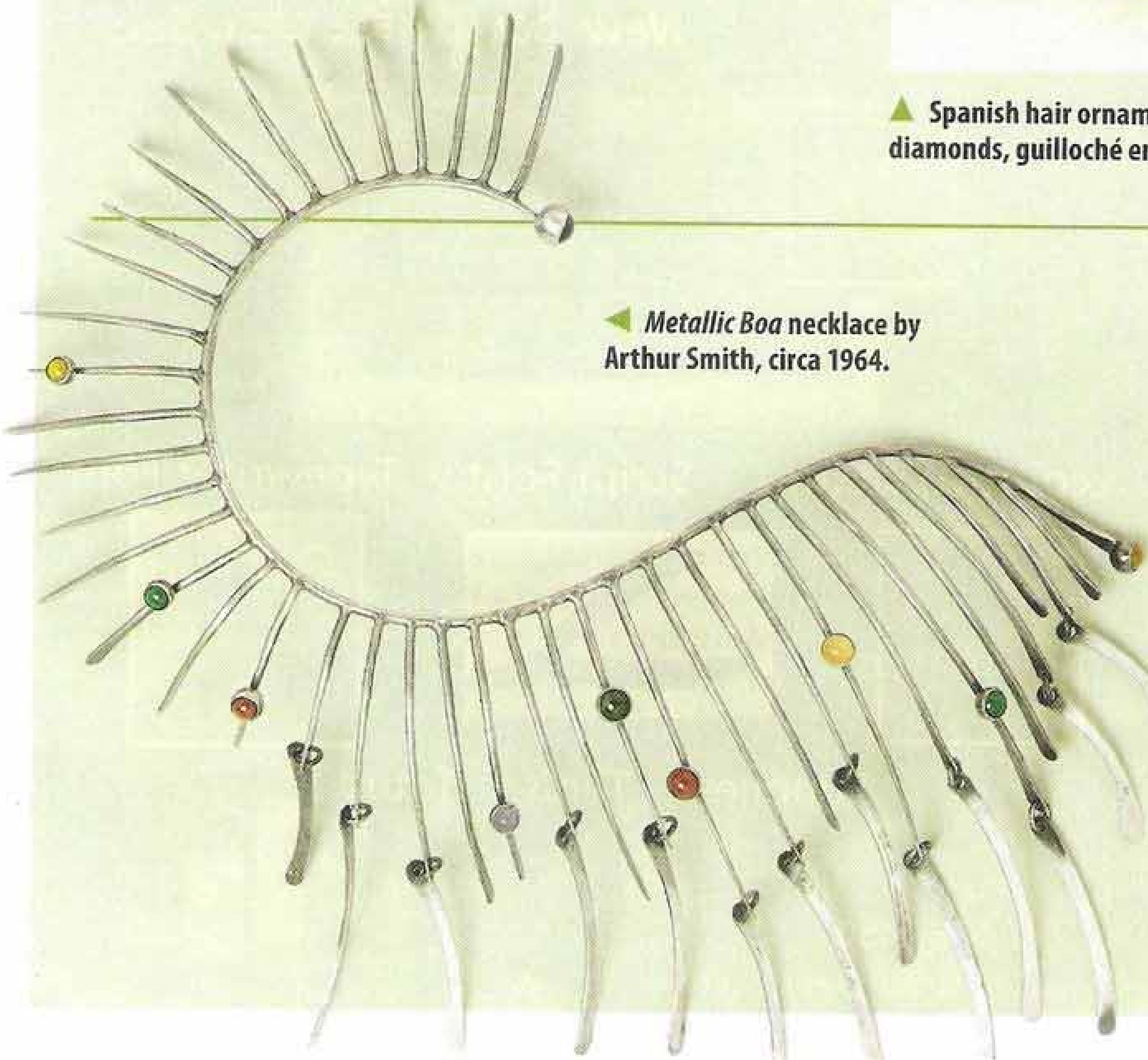
When: October 23, 2009–March 28, 2010

Where: The Field Museum, Chicago

For more information: www.fieldmuseum.org



▲ **Spanish hair ornament, late 18th century. Gold, carbonized steel, diamonds, guilloché enamel.** Photo by Roderick Mickens.



◀ ***Metallic Boa*** **necklace by Arthur Smith, circa 1964.**

exhibit: *From the Village to Vogue: The Modernist Jewelry of Art Smith*

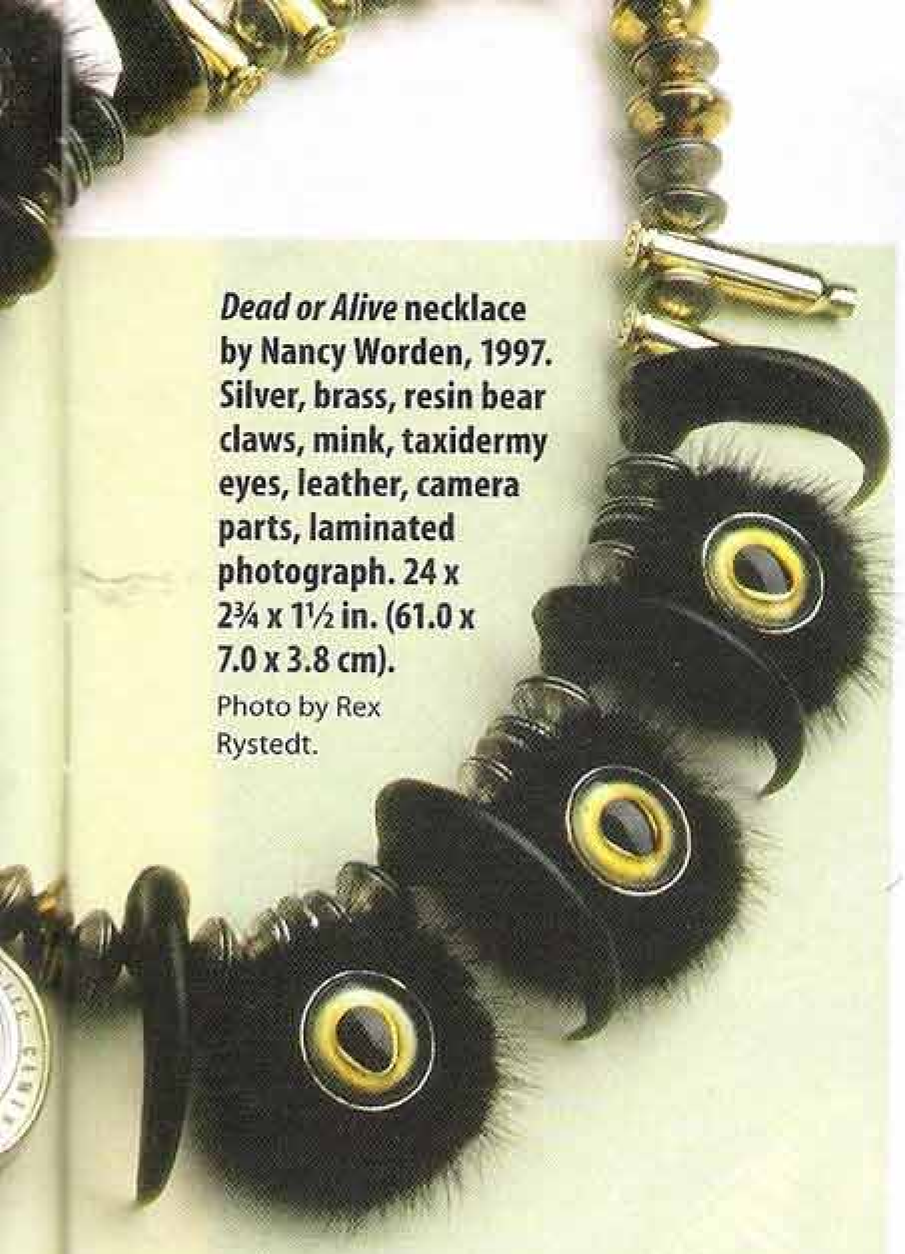
What: The exhibit features 21 works by Brooklyn-reared modernist jeweler Arthur Smith. Inspired by surrealism, biomorphicism, and primitivism, the jewelry pieces date from the late 1940s to the 1970s.

When: Now–February 21, 2010

Where: Brooklyn Museum, Brooklyn, N.Y.

For more information: www.brooklynmuseum.org

▶ **Model wearing** ***Modern Cuff*** **bracelet by Arthur Smith, circa 1948.** Photos courtesy of Brooklyn Museum.

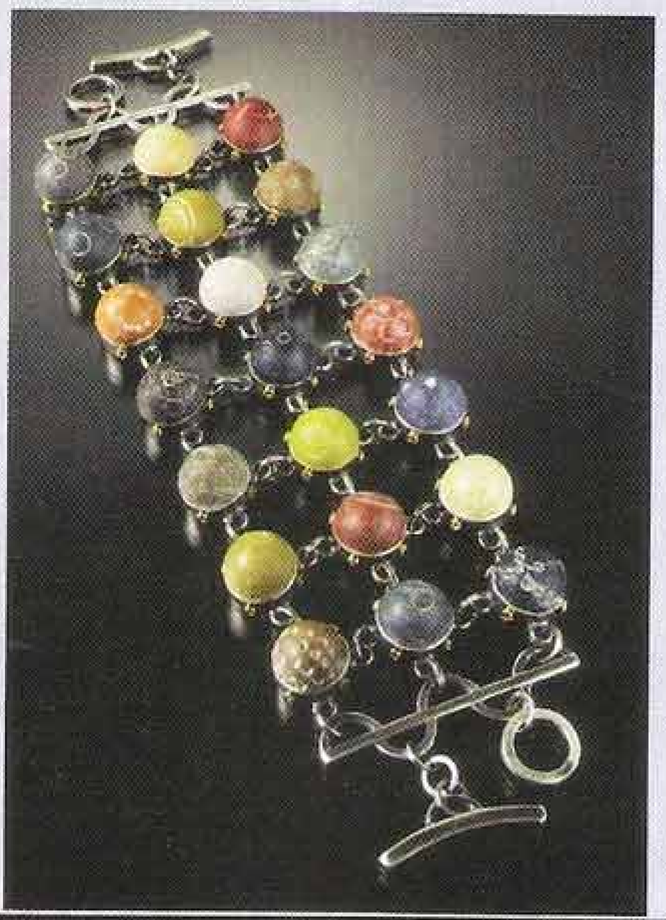


***Dead or Alive* necklace by Nancy Worden, 1997. Silver, brass, resin bear claws, mink, taxidermy eyes, leather, camera parts, laminated photograph. 24 x 2¾ x 1½ in. (61.0 x 7.0 x 3.8 cm).** Photo by Rex Rystedt.

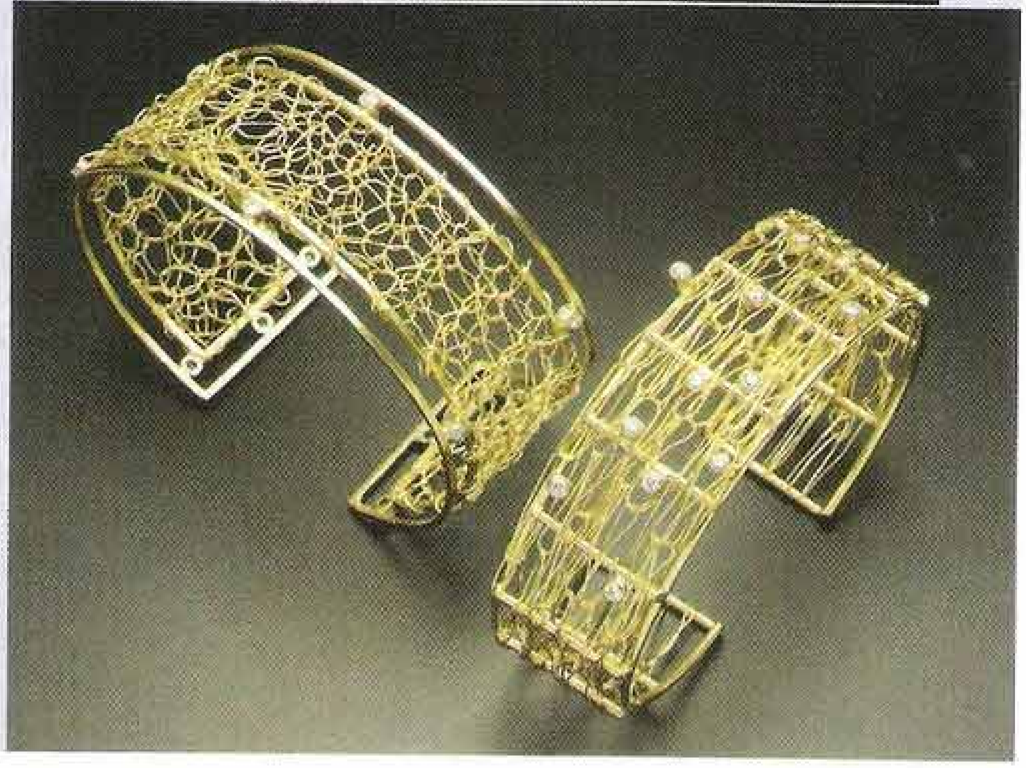
▲ **Raw diamond in matrix.** Photo courtesy of The Field Museum.

show: One of a Kind Show and Sale Chicago

What: Ninth annual juried fine craft show featuring over 500 artists from North America.
When: December 3–6, 2009
Where: Merchandise Mart, Chicago
For more information: www.oneofakindshowchicago.com



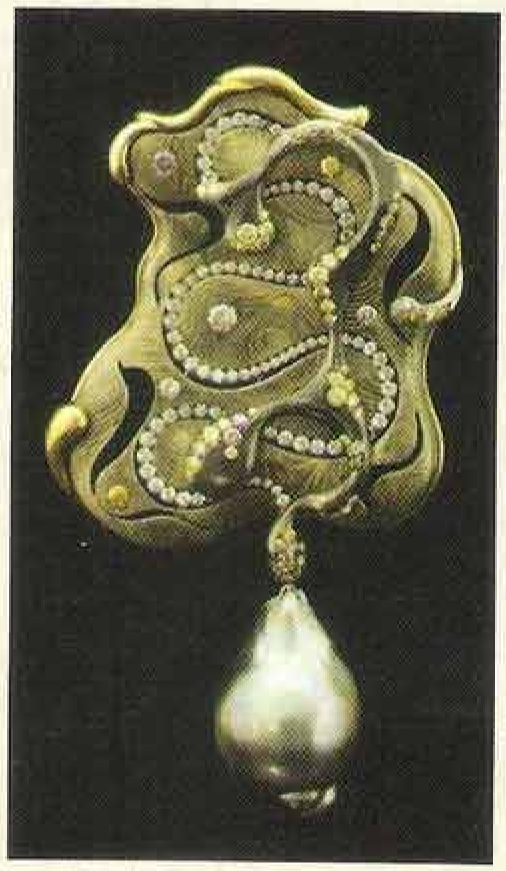
▶ **Bracelet by Mary Filapek and Lou Ann Townsend. Sterling silver, polymer clay.** Photo courtesy of One of A Kind Show and Sale Chicago.



▶ ***Frame Cuff* and *Bamboo Cuff* by Randi Chervitz. 18k gold, white diamonds.** Photo by Don Casper.

call for entries: 19th Annual MJSA Vision Awards Design Competition

What: The Manufacturing Jewelers & Suppliers of America (MJSA) is accepting submissions for its annual competition that recognizes the talent and innovation of jewelry designers. Professional and student jewelers are eligible to submit digital images and supporting information for industry recognition.
When: Entries must be postmarked by January 15, 2010.
For more information: Submission guidelines and entry forms available at www.mjsa.org AJ



▶ ***Treatise* by James W. Currens, 2009. 1st Place Professional Mokume-gane Distinction Award.** Photo courtesy of MJSA.

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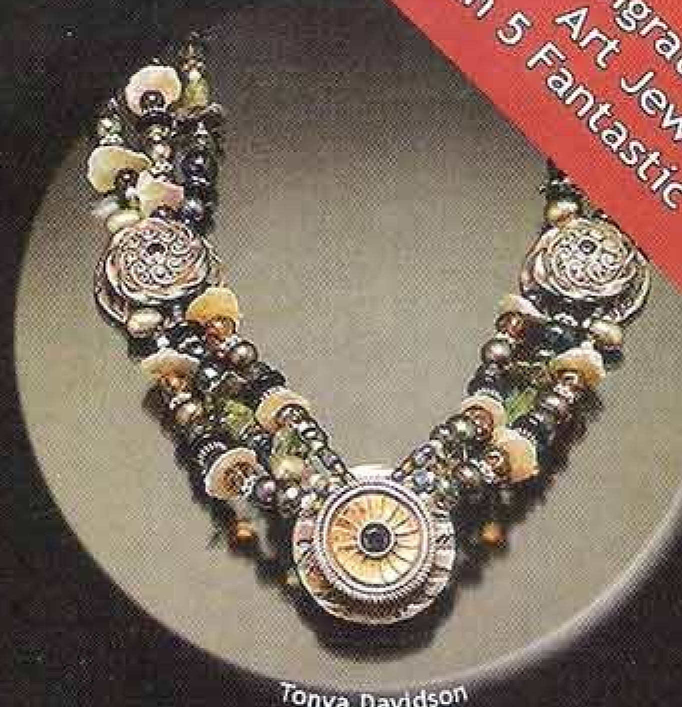

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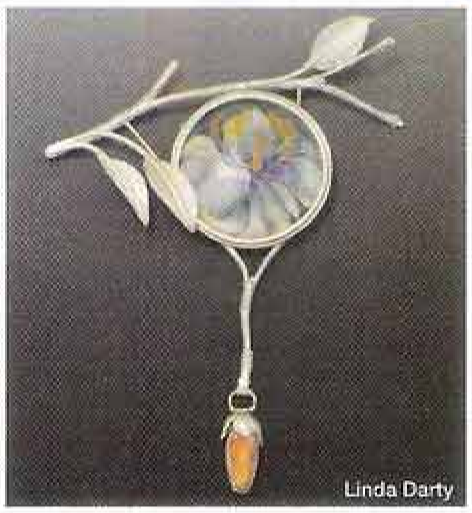
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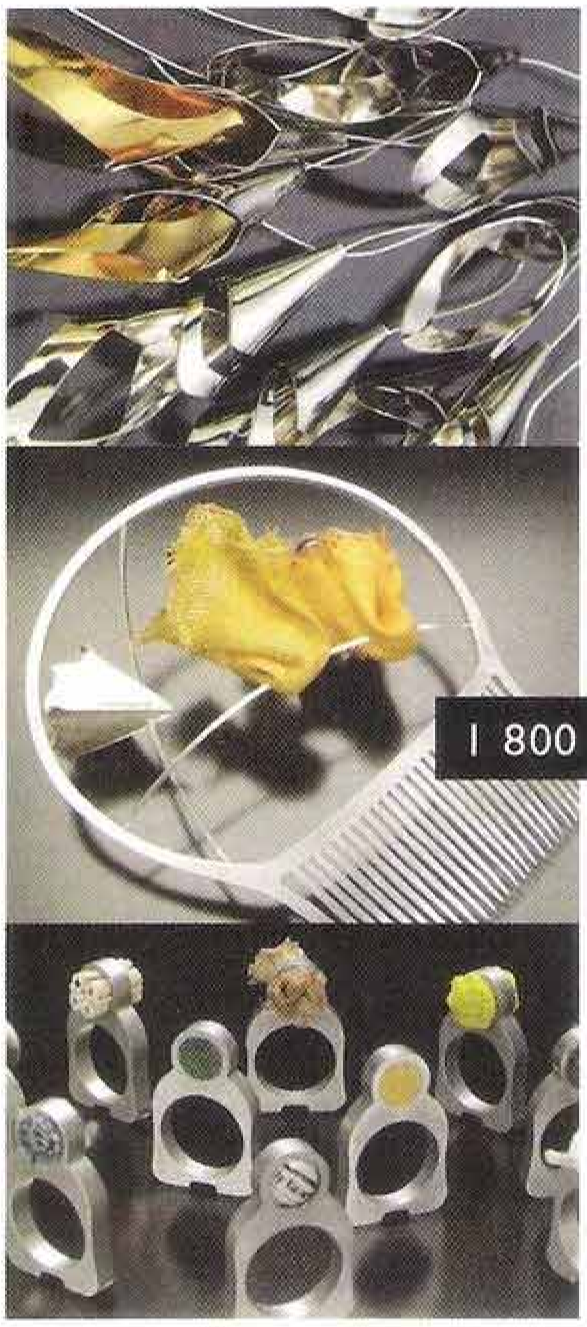

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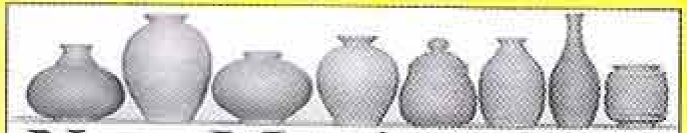

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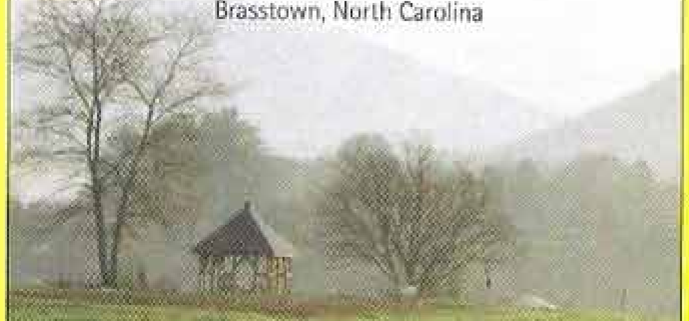

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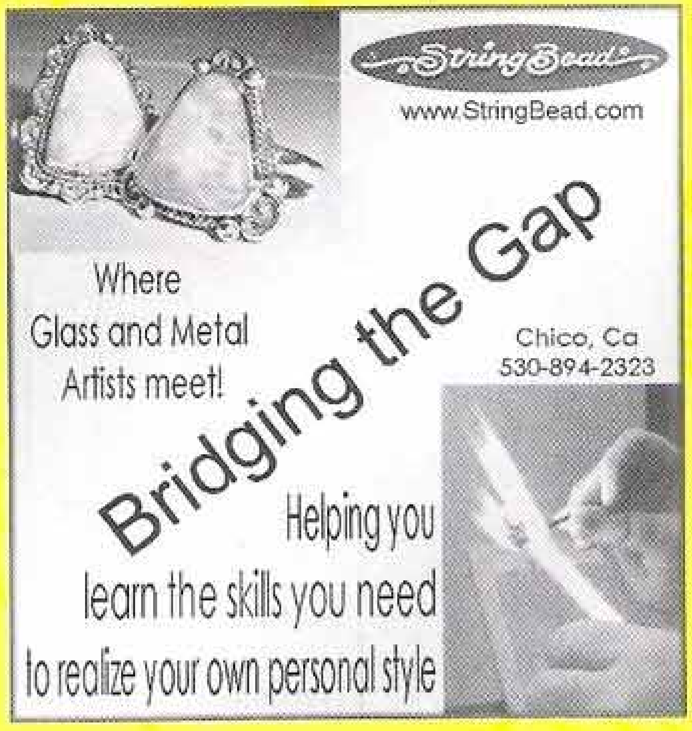
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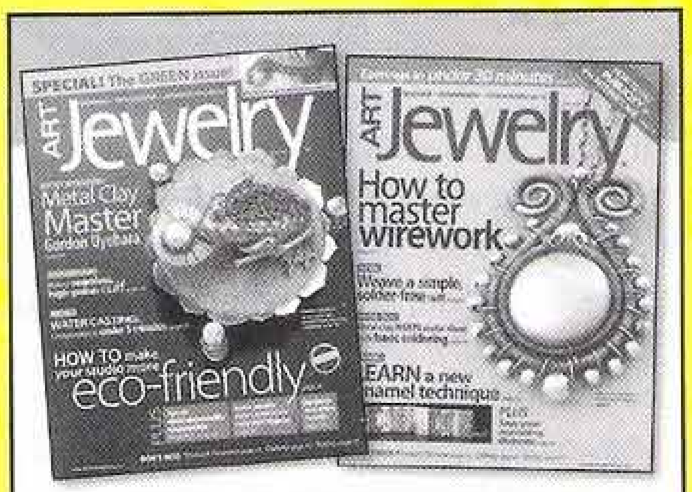
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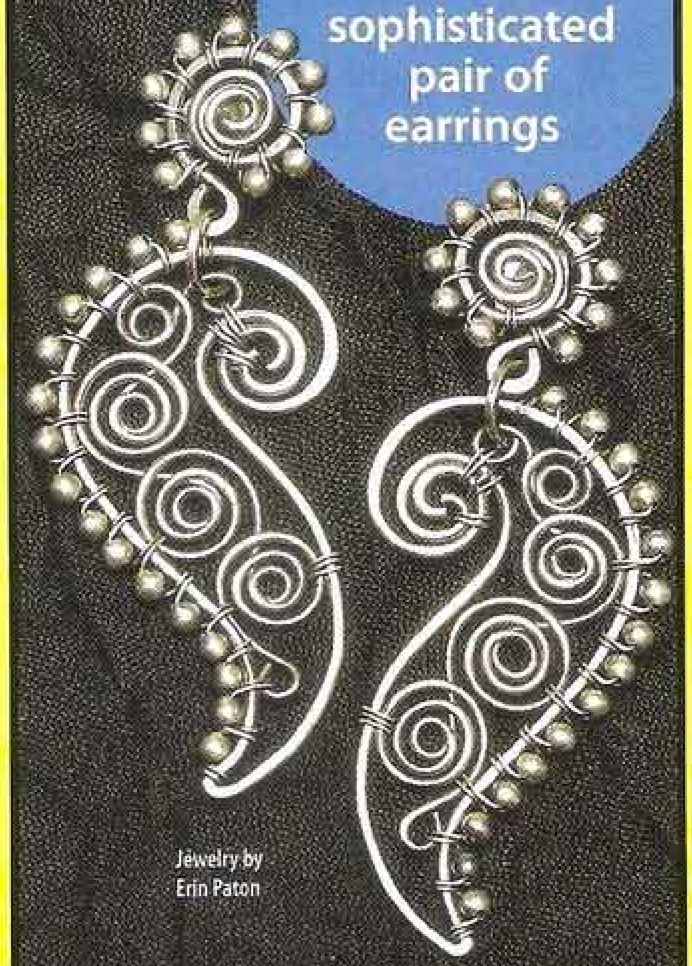
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Sawing 101

by Michael David Sturlin

The jeweler's saw looks deceptively simple. A wooden handle, a U-shaped metal frame, and a couple of thumbscrews — and yet this implement is one of the most precise and essential tools in the jewelry maker's toolbox.

The tool

The jeweler's saw is a style of hand-powered saw called a "draw saw," meaning that the cutting is done by drawing the blade downward against the material being cut. The blade itself is a piece of metal with directional teeth. The blade is clamped in the opening of the saw frame and secured by the thumbscrews (see "Anatomy of a Saw," *above right*).

Saw frames come in a variety of styles and sizes. Some have cushioned handles and alternate blade-locking devices, but the standard German-style saw frame with wooden handle and thumbscrews is still preferred among goldsmiths and professional jewelry makers.

The frame itself has two basic formats: adjustable and fixed. There are many throat depths available, ranging from 60 mm to 200 mm. The shallower the frame, the easier it is to maneuver and the more precise your cuts will be; the deeper the frame, the more difficult it is to control, but the further you can cut into a large piece of metal. It's like the difference between steering a sleek, sexy sports car and a motor home. I suggest starting with a shallow frame, 60–75 mm throat depth.

suggested purchases

- **Standard German-style adjustable saw frame: 70 mm throat depth**
- **Good-quality German or Swiss saw blades: 1/0, 3/0**
- **Practice metal: Copper or brass sheet, minimum 18 gauge (1.0 mm)**

Saw blades

Saw blades come in graduated sizes from 8 (largest) to 8/0 (pronounced "eight aught"). The numbering diminishes from 8 to 0 and then from 1/0 to 8/0. The size of the blade you'll need depends on the thickness of the metal you're cutting or the intricacy of your design.

A common bit of advice is that the correct size of saw blade should have two or three teeth in contact with the metal at all times. (There's a handy "Metal Piercing Chart" at www.artjewelrymag.com/reference.) Many makers of fine jewelry often use blades smaller than that.

The teeth of the saw blade cut away small chips of metal with each downward stroke like a series of tiny chisels. The resulting cut is actually a serrated line, not a smooth cut. A larger blade cuts larger chips, so you'll cut faster, but there's a trade-off: the larger the blade, the more serrated the line, and the more filing you'll need to do to smooth your edge.

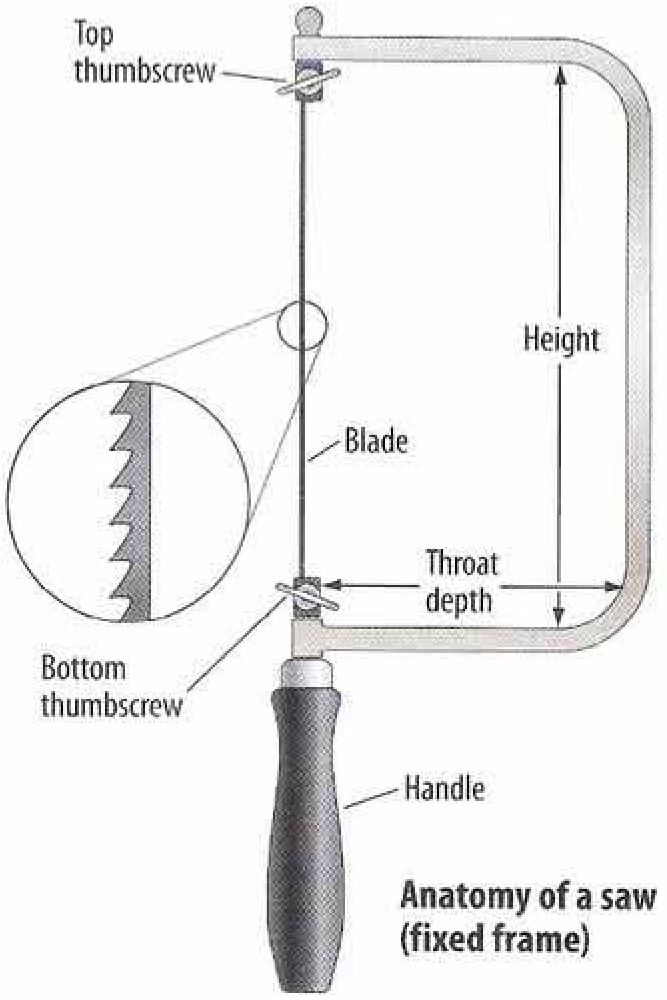
You can buy saw blades by the dozen or by the gross (12 dozen). Buying a gross of saw blades might seem like overstock, but there is generally a significant price break when purchasing a gross instead of a dozen, and you *will* break a lot of blades — everyone does!

German- and Swiss-made blades are generally considered the best and are most widely used. (I prefer the German brand Antilope.) Good blades are usually less brittle than inexpensive ones, and superior blades have a rounded back, which facilitates turning while cutting. Many beginners have difficulties sawing; often this is directly related to using inexpensive, brittle blades, which are challenging to turn and easy to break.

Stringing the saw

To string your saw with enough tension to hold the blade taut, you'll need to put the saw frame under slight pressure. First, with the teeth pointing forward and downward toward the handle ("down and out" is an easy way to remember this), insert the bottom of the blade in the bottom thumbscrew, and tighten the screw to secure the end of the blade.

Then brace the top of the frame against the face of the bench, and align the top of the blade with the top thumbscrew. Using your shoulder or your hand, push the handle of the saw forward to close the frame 5–6 mm (about ¼ in.). Tighten the top screw with the blade in place, then release the pressure on the saw frame.



Anatomy of a saw (fixed frame)

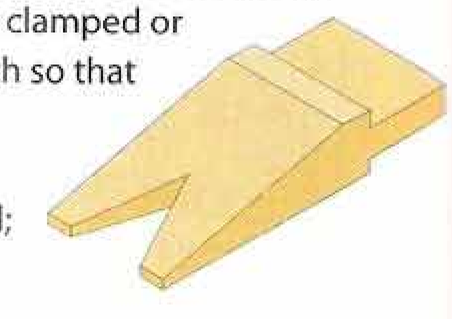
To test the tension, pluck the blade like a guitar string; you should hear a nice, high "ping." If the tone is a dull "pong," the blade is not tight enough.

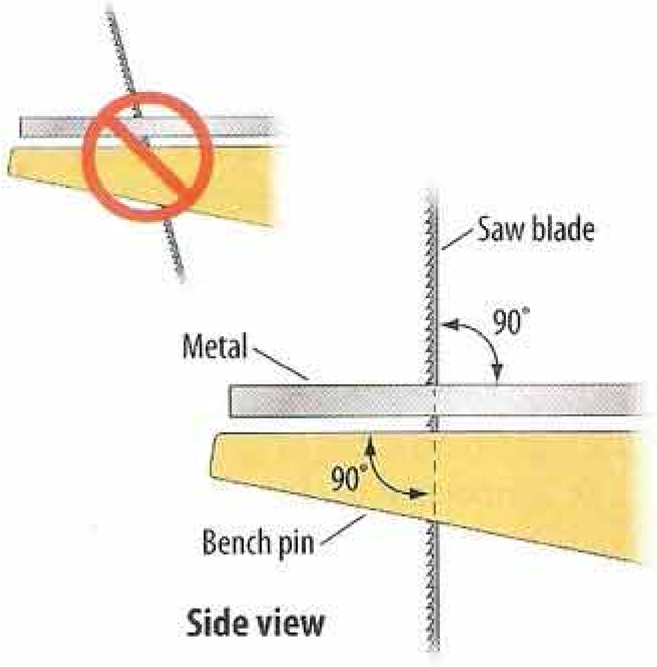
If strung too loosely, the blade will be hard to control and will drift to either side of the intended cut. If strung too tightly, the blade will break easily when you apply sideways pressure, making it hard to turn. A tightly strung saw blade will bind and break more easily than a loosely strung blade, but will produce a straighter cut.

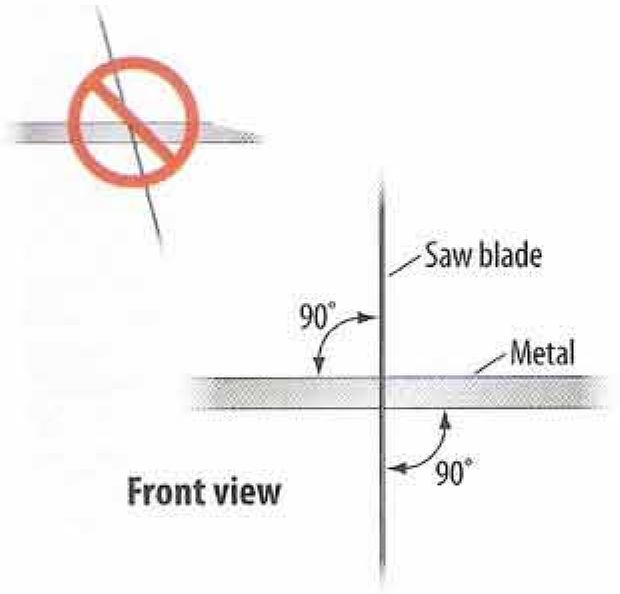
Holding your work: bench pin

The saw frame is used with a bench pin, which is a piece of wood attached to the face of the bench. A standard bench pin is a wedge shape, thinner at the front and thicker at the back. The working surface is 65 x 125 mm (2½ x 5 in.), and there's a thinner tang for attaching it to the bench. A standard goldsmith's bench has a slot in the face board for the tang. If your bench does not have this slot, you can attach the bench pin with a C clamp. (Make sure the bench pin is tightly clamped or fitted into the bench so that it does not move.)

One side of the bench pin is angled;







Keep your blade vertical and perpendicular to the plane of the work while sawing.

the other side is flat. For sawing, position it flat-side up. Most jewelers cut a V into the front center of the bench pin so they can position their work over the V and support the metal on the bench pin while sawing. (You can buy bench pins with a precut V.)

While sawing, your two hands will be working in unison while doing two very different things. Your dominant hand controls the saw with a relaxed, comfortable grip. Your nondominant hand holds the work steady against the bench pin.

To hold the work on the bench pin, use your fingers on top of the metal to press downward, and use your thumb below the bench pin to press upward. Your fingers should be arched, with only your fingertips touching the surface of the metal. The position of the hand is like a C clamp, or like the position of a guitarist's hand and fingers against the fretboard of a guitar.

Keep your fingers well away from the blade so that an errant cut will contact wood rather than flesh. While sawing, you'll need to repeatedly clamp and release your nondominant hand to reposition the piece. Your nondominant hand usually will absorb far more stress than the one that appears to be doing all the work; to prevent cramping and fatigue, take regular breaks, relaxing your hands.

Getting started

On the downward stroke of the first saw cut, the blade tends to chatter and skip away from the starting point. To alleviate this, place the blade against the starting point. Hold a finger or thumb of the opposite hand against the back of the blade so it doesn't move to the side, and gently push the blade upward to make a mark or guide on the edge of the metal. This guide will hold the blade in place as the first pull downward begins the cut.

Lubricate the saw blade with wax so it slides more easily against the metal and to prevent binding and breaking. Candle wax works well; you can also use other lubricants, such as bur lube.

Cutting a straight line is like learning to drive a car; it requires sighting down the blade and keeping an eye on where you're going. Just as with steering a car, looking too close in front of the blade results in frequent minor corrections to keep the cut on the line. Gazing further along the path the saw blade is following produces a straighter line. When you're starting out, direct the saw away from your body to facilitate sighting down the blade toward your goal. After more practice, you can orient the saw in any direction; choose a position with the best view of the work.

Using the saw

The correct way to saw is with a smooth, repetitive up-and-down motion. Hold the saw comfortably in your hand, and grip it between your thumb and first finger. Wrap your remaining fingers around the handle in a loose grip. For maximum control, hold the saw close to the top of the handle.

Keep your hand relaxed while you saw; holding the saw loosely allows more control and is less fatiguing than gripping the handle firmly. Gripping too tightly or clenching your fist will reduce your ability to direct the saw with skill and grace.

Keep the blade perpendicular to the plane of the work; if the blade is angled, the cut will not be square and you'll be more likely to break blades. The most efficient, easily controlled position is to hold the blade vertical without inclining it forward or backward.

The sound of the blade as it cuts is a good indication of how the saw is moving. The strokes should sound smooth and even. Don't rush; a steady, measured pace will produce a more controlled and even cut. If it is raspy or stuttering, either the blade needs lubrication or you are applying too much pressure to the saw.

perception and perspective

Most sawing and piercing is really just cutting lines, either straight or curving. Breaking it down to "just lines" simplifies the process and reduces the complication of a design by viewing the basic parts, rather than the whole structure.

It is all about perception and perspective. In piercing, where some areas are removed and some remain, the first step is recognition of the design as positive or negative space. Is the area that's being removed the design, like a silhouette? Or is the area that remains the design?

Once we have this perception of the design, we can determine how we are looking at the object as we saw or pierce. Are we looking at the area being removed, or the area remaining? This is important to establish so we know which side of a line we are cutting.

When the blade starts to bind, people tend to grip the handle tighter, which only aggravates the problem. Instead, let go of the tool and relax your hand. Then re-establish a proper grip before continuing. Stress in the hand will transfer to stress in the tool, which will transfer to stress in the object, which rarely increases precision or dexterity.

Turning corners, cutting curves

To saw a curved line, you can either turn the saw and hold the work still, turn the work and hold the saw still, or a combination of both. It is actually easier to cut a smooth, even curve by turning the work than by turning the saw.

As you cut, hold the saw in a fixed

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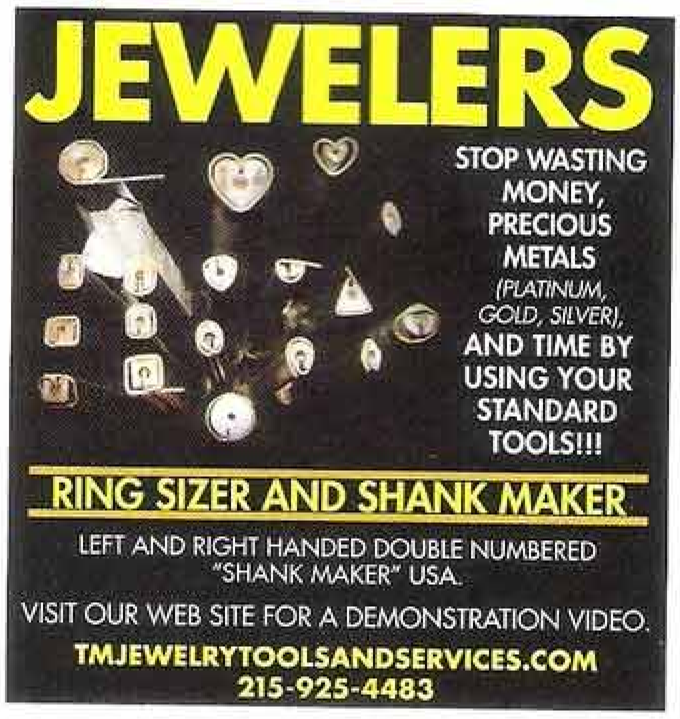
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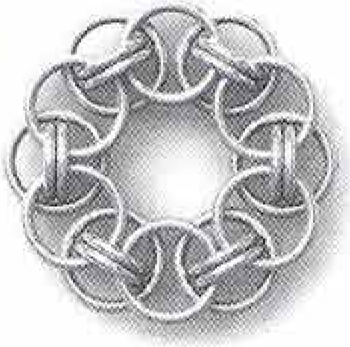
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direction, and slowly rotate the work into the moving blade. Small radius curves or diminishing curves, as in a spiral, might require a smooth combination of turning the work into the blade and also turning the wrist to increase the tightening curve as the line is cut.

It's important to remember that the blade can only turn or rotate while the saw is moving up or down; if you twist the blade while it's not moving, it will bind and snap. The motion of keeping the blade moving is like marching in place: slide the blade up and down with no forward pressure and use your wrist to slightly rotate the blade.

When cutting sharp corners, it's often easier to make the turn if you back the blade into position and then rotate it to the side. If your cut requires too much maneuvering to back the blade out, unstring the blade and turn the work to reinsert the blade into the cut facing backward.

As with the acquisition of any new skill, practice makes perfect. Try cutting repetitive shapes until using the saw is familiar. When you've developed more control, gradually increase the difficulty level. AJ

Michael David Sturlin is a studio jewelry artist, educator, consultant, and award-winning goldsmith whose jewelry is widely published and displayed in select galleries throughout North America. He is a faculty member of the Revere Academy of Jewelry Arts and a popular visiting guest artist and conference presenter. Sturlin devotes his time to sharing his expertise and insight with students at every level, from beginners to accomplished professionals.

online extras

Check out the practice sawing patterns at www.artjewelrymag.com/reference.

Subscribers, use your sawing skills to make a pair of "Simple Saw-Cut Earrings," available as a free PDF at www.artjewelrymag.com/projects.

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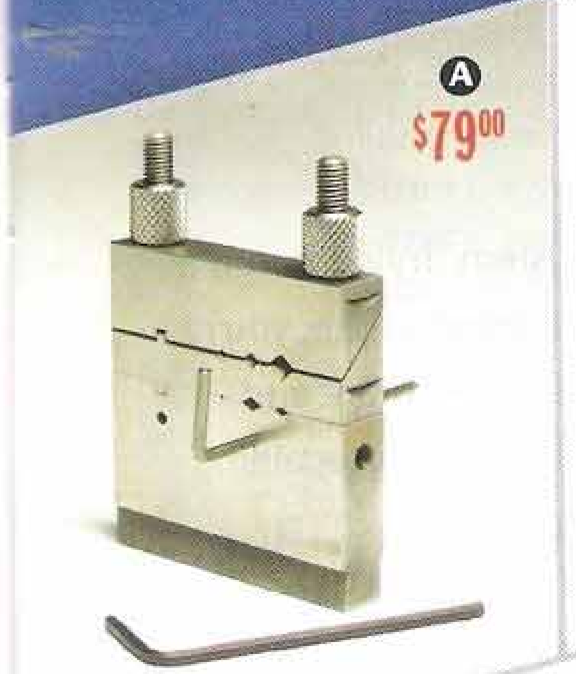

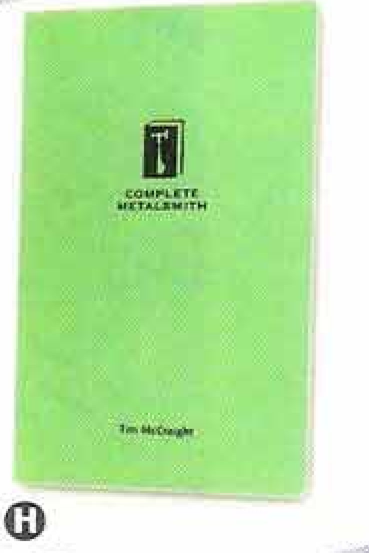

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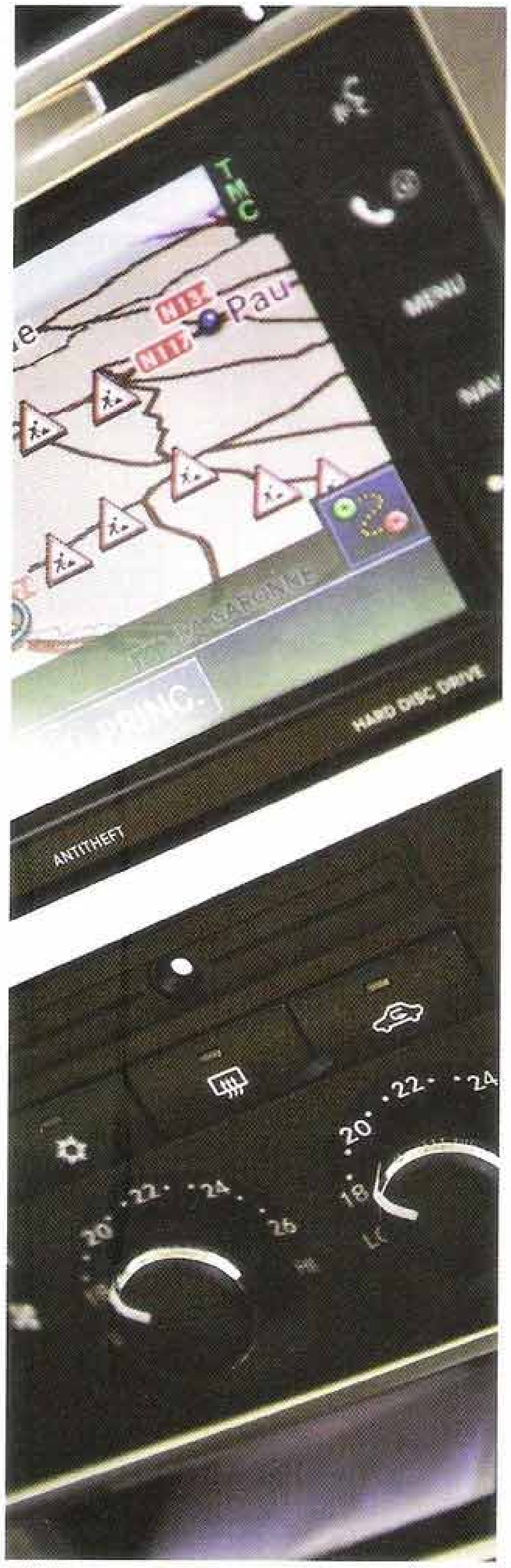
A business plan: why you need one, how to write one



by Marlene Richey

A business plan is like a map or reliable GPS system. Trying to run a business without a plan is like taking a trip without a map; you're likely to get lost somewhere between your starting point and your destination. And without a map to plot your way, regaining your direction can be really tough if you encounter a detour or two.

Seriously, you really need to have a plan

According to a widely accepted business principle, the business owner who has a written plan in place has exponentially better odds of his or her business being a success than the business owner who doesn't have a plan.

Still not convinced that you want to take the time to research and write a business plan? Then think of your plan as one of the best ways to safeguard against costly mistakes. It's also a black-and-white summary that you can present to potential investors, your bank, your accountant, your employees, and your spouse to prove that you are serious about making your jewelry business financially viable.

A work in progress

Unlike a static document, a business plan is a living, breathing, constantly evolving work in progress. As situations change with your business or the marketplace, you can adjust your plan to reflect those shifts. Plus, you'll have a record of where you've been and where you want to go. By revisiting your plan periodically, you can check your progress and decide whether the direction you're heading in is still best for your business.

Keep it simple

Basically, a good business plan covers:

- Who you are
- Where you want to go
- How you plan to get there
- Your immediate goals
- Your ultimate goals
- The costs of running your business

A five-page plan will generally suffice for a start-up jewelry/art/fine-craft/design company; content is more important than length. Be specific, accurate, and realistic, especially when you are summarizing financial information.

Use an outline format with bullet points to make it easy to find and read the information in your plan. Include images of your work; jewelry making is a visual-art business.

Researching, writing, and maintaining a business plan are empowering steps for a business owner. By completing a pesky task that you may have been putting off, you're embracing the attitude of a conscientious, dedicated entrepreneur who knows where she's going and how she'll get there. AJ

online resources

There is an overwhelming assortment of information about writing a business plan that you can access at your library or by doing a little online research. Here are three Web sites that will get you started:

- www.sba.gov/smallbusinessplanner/plan/writeabusinessplan/index.html
- www.entrepreneur.com/businessplan
- www.bplans.com

Marlene Richey can be reached via e-mail at marlene.richey@comcast.net.

A basic business plan outline

Here is the information you need to provide and the questions you need to answer as you pull your plan together.

I. The business

A. Business structure. Are you operating as a sole proprietorship? A partnership? A corporation?
B. Background of your company. Give a short history of your business.
C. General goals and projections. Where do you intend to be 1, 3, and 5 years from now?
D. Location. Where will you have your studio/office? What are the advantages and disadvantages of this site? Is it secure?

II. The product

A. In-depth description of your product and your design philosophy.
B. Any copyrights you hold.
C. Processes you use to create your jewelry.

III. Marketplace and sales

A. Which specific market you are entering. Fine jewelry? Fine craft? Fashion? Art? Wholesale, retail, or both?
B. Where customers will purchase your jewelry. Online stores? Fine craft and art shows? Galleries? Home shows?
C. Competition. What other jewelers make a product similar to yours? How is your product different? Be honest!
D. Trends. What are the economic trends for selling jewelry in your area? Are there fashion, political, or social issues that could impact your business?

IV. Marketing and media relations

A. Your business image. How will that image be reflected in everything you do?
B. Identify your ultimate customers/clients. Describe them. Why do they want to buy your jewelry?
C. Getting your message out. What types of technology and media will you use to find and contact your customers and vendors?

V. Personnel

A. Resume and bio.
B. Strengths and weaknesses. What personal business and creative advantages do you bring to this specific market? What shortcomings and liabilities (I'm not talking financial here) must you compensate for?
C. Business partners and support staff. Who will be helping you with your business? What are their professional qualifications and areas of expertise? Will they be providing funding for your venture?

VI. Financial data

A. Capital. Do you need to raise or borrow money to start/continue your business? How much money do you need? When do you need it? How are you going to repay it?
B. Balance sheet. A balance sheet shows your company's finances as of a specific date.

BALANCE SHEET FORMULA:
Assets *(what you own)*
– Liabilities *(what you owe)*
Value of your company

C. Income statement. Your income statement is a record of your business activity for a specific period of time and indicates whether you are making a profit.

INCOME STATEMENT FORMULA:
Revenue *(money coming in)*
– Costs *(money going out)*
Net income

NOTE: A professional accountant or bookkeeper can help you pull together your balance sheet and income statement.

VII. Conclusion

A short, concise statement that pulls together all the above information.

VIII. Images

Prints and visual materials that present your jewelry. Include coverage in publications, award-winning pieces, celebrities wearing your work, etc.

IX. Credit references and letters of recommendation

Bank references and letters of recommendation from lenders, venture capitalists, vendors, show promoters, etc.

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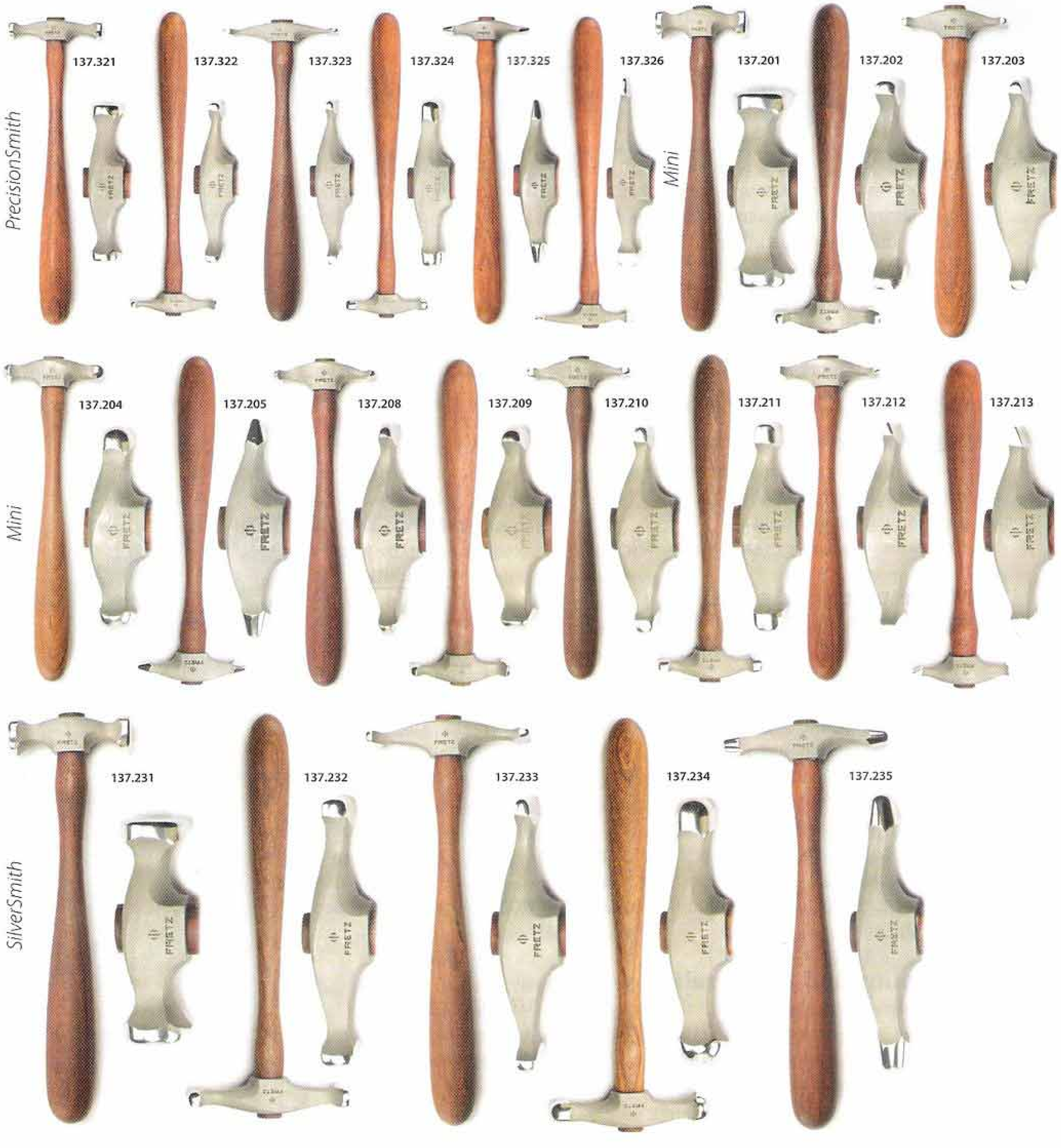
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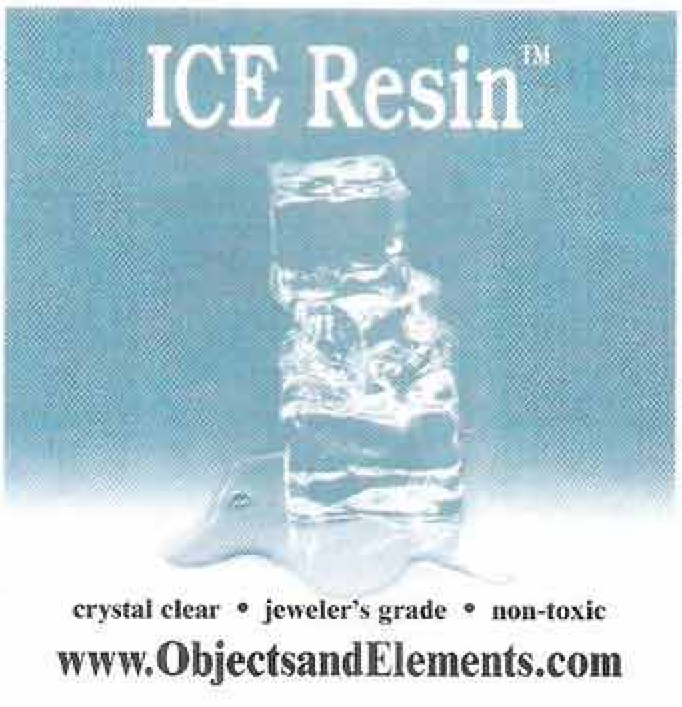
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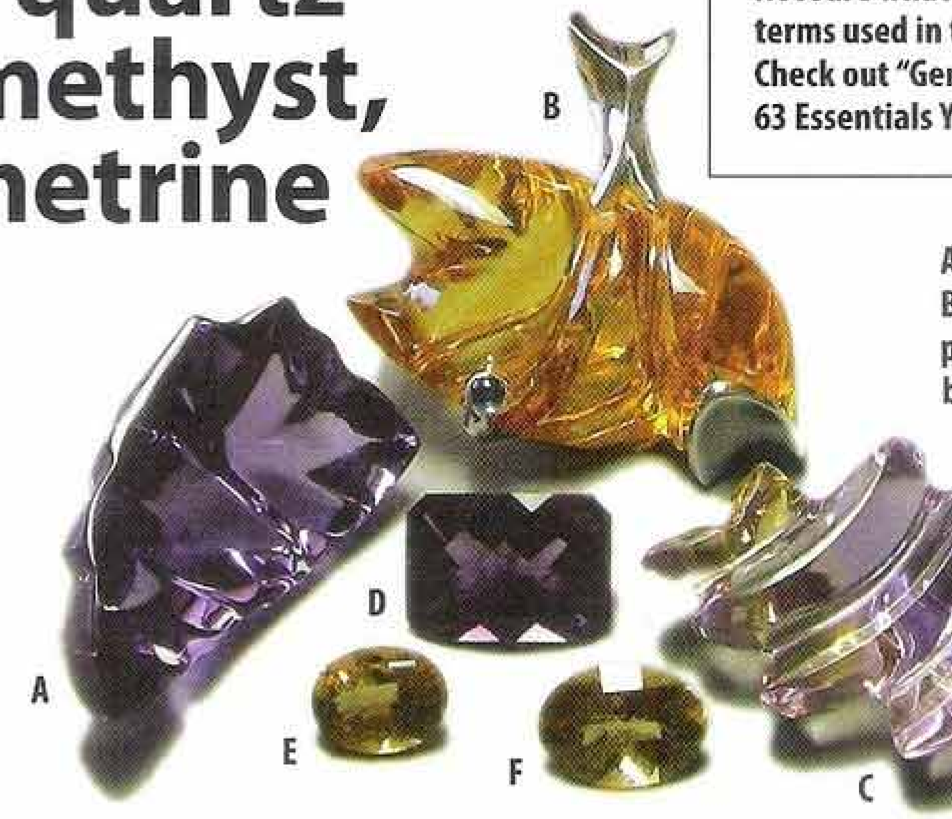
Three colorful quartz gemstones: amethyst, citrine, and ametrine

by Richard M. Shull, G.G.

Not sure what some of the gemology terms used in this column mean? Check out "Gemstone Terminology: 63 Essentials You Should Know," ***page 78.***



A. Bolivian amethyst
B. Heat-treated citrine pendant. 14k white gold, blue sapphire. Setting by Wayne Lenkeit.
C. Ametrine from Anahi Mine, Bolivia
D. Natural-color amethyst from Four Peaks Mine, Arizona
E, F. Natural-color California citrines

Stones carved by Richard M. Shull, G.G.
Photo by Richard Shull and Helen Constantine-Shull.

The attractive purples of amethyst and the yellow-orange hues of citrine have been favorites of jewelry lovers for centuries. More recently, ametrine, a combination of amethyst and citrine, was discovered in large enough quantities to make it to the international gemstone market.

Geologically speaking

Although quartz is the second most common mineral on earth, colorless "rock crystal" quartz is relatively rare. Even rarer than water-clear quartz are the varieties of desirable colored quartz like amethyst, citrine, and ametrine.

These varieties start out as quartz crystals that have traces of iron ("color centers") in their structure. Geologically speaking, soon after these crystals were formed, they were exposed to heat, radiation, or both, which activated the iron and caused the quartz to take on different hues, ranging from lilac to deep purple, pale yellow to deep red-orange, and in the case of ametrine, all of the above.

Amethyst

Deriving its name from the ancient Greek "amethystos," meaning "not drunken," amethyst was believed to protect the wearer from the effects of the vine.

Today, much of the amethyst (and citrine) seen at shows, on the Web, or in catalogs comes from Brazil and Bolivia. However, deposits in North America, Africa, and Northern Asia have also contributed fine amethyst (and some citrine) to the jewelry market.

Some of the finest amethyst has historically come from Siberia, but stones from these deposits are rarely seen today. The best Siberian gems are a rich, deep purple and, when faceted, reflect bright red and blue flashes deep within the pavilion of the stone.

Currently, amethyst from the Zambian countryside and the Four Peaks Mine in Arizona produce fine gems with similar, if not equal, color to the Siberian amethyst.

Heat treatment

Treating amethyst with heat alters it to a medium yellow-orange citrine that is prevalent in today's market. Some amethyst can turn a greenish or green-yellow color when it's heated; these stones are marketed as "prasiolite" or "green amethyst."

quartz: jewelry use & care

Suitable uses: Rings, bracelets, pendants, earrings, and beaded designs. Avoid exposed-setting designs in rings and bracelets; quartz may be brittle if struck

Care: Clean with mild jewelry cleaner or dish soap and warm water

Storage: Keep quartz away from heat and sun; ultraviolet light can cause some amethyst to fade over time

Citrine

The name citrine comes from French word for lemon, "citron." Unsuspecting buyers often bought citrine from sellers who passed off the stone as Spanish topaz.

Naturally colored citrine is fairly rare. Most of the citrine in today's market was dug from the ground as pale amethyst or golden brown smoky quartz and then heat-treated to more saleable colors.

Smoky quartz that has a golden or yellow, rather than a grey, undertone can be heat-treated so that the brown color fades, leaving various shades of citrine. However, if the temperature is too high,

digging the science of quartz

Some basic information about quartz:

- Chemically known as silicon dioxide (SiO_2)
- The second most common mineral on earth (feldspar takes first place)
- Has a hardness of 7 on the Mohs scale
- Amethyst, citrine, and ametrine are colored varieties of quartz that have been mined around the world in locations with silica-rich rock formations like granite
- Amethyst, citrine, and ametrine are frequently lab grown and passed off as works of nature

the yellow color may also fade, leaving the quartz colorless.

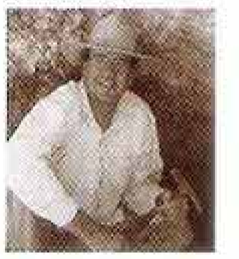
The popularity of citrine follows fashion trends. In the past, the most desired color was a deep, dark burnt orange named after the Portuguese wine from the Madeira Islands. Trends changed, and medium- to tangerine-orange stones are now the most popular and well known. A popular color in today's market is a green-yellow heat-treated quartz marketed as "oro verde."

Ametrine

Ametrine is a bicolor combination of amethyst and citrine. When ametrine initially became prevalent in the American gem trade, the material was natural and untreated. Nowadays, it's not uncommon to see synthetic ametrine. Mined ametrine comes primarily from the Anahi mine in Santa Cruz, Bolivia — also a leading producer of natural-color citrine and amethyst. Recently, the Anahi mine has become famous for its bicolor stones.

Inspiration

A common attribute of amethyst, citrine, and ametrine is that they are available in so many forms to inspire the creative jewelry maker. Whether you like the natural glitz of drusy, glowing high-domed cabochons, fine faceted center stones, colorful gemmy beads, or striking contemporary carving, these quartz varieties deliver the goods and are sure to remain classic gemstones for centuries to come. AJ



At the age of 9, Richard M. Shull began scouring rock shops on family vacations and creating jewelry pieces from his finds. Today, as a graduate gemologist, Shull's full-time pursuit of the gemstone arts includes mining his own natural gem materials. His carving work has been internationally recognized and featured in many trade publications. Shull can be reached via e-mail at info@outofourmines.com. Photo by Helen Constantine-Shull.

is it real or synthetic?

In the last 20 years, the market has seen a dramatic increase of synthetic faceted quartz. Amethyst, citrine, and ametrine are often lab grown and passed off as natural. Synthetic amethyst, citrine, or ametrine should be relatively inexpensive. Look for these "tells" that indicate a faceted stone is synthetic:

- A seed plate (optical rock crystal) used as a substrate on which to grow synthetic amethyst or citrine
- A colored stone with a clear stripe in the girdle that runs parallel to the table

For peace of mind when you purchase stones, get detailed information in writing from the seller. Reputable dealers will provide a brief description of the stone and disclose whether the stone is treated or synthetic.

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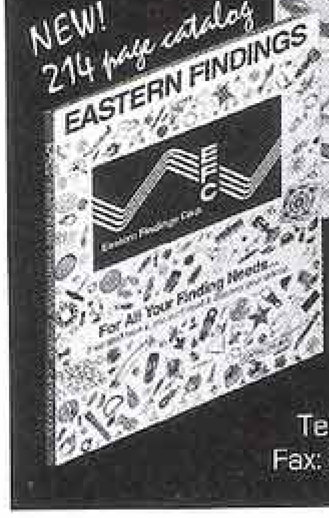

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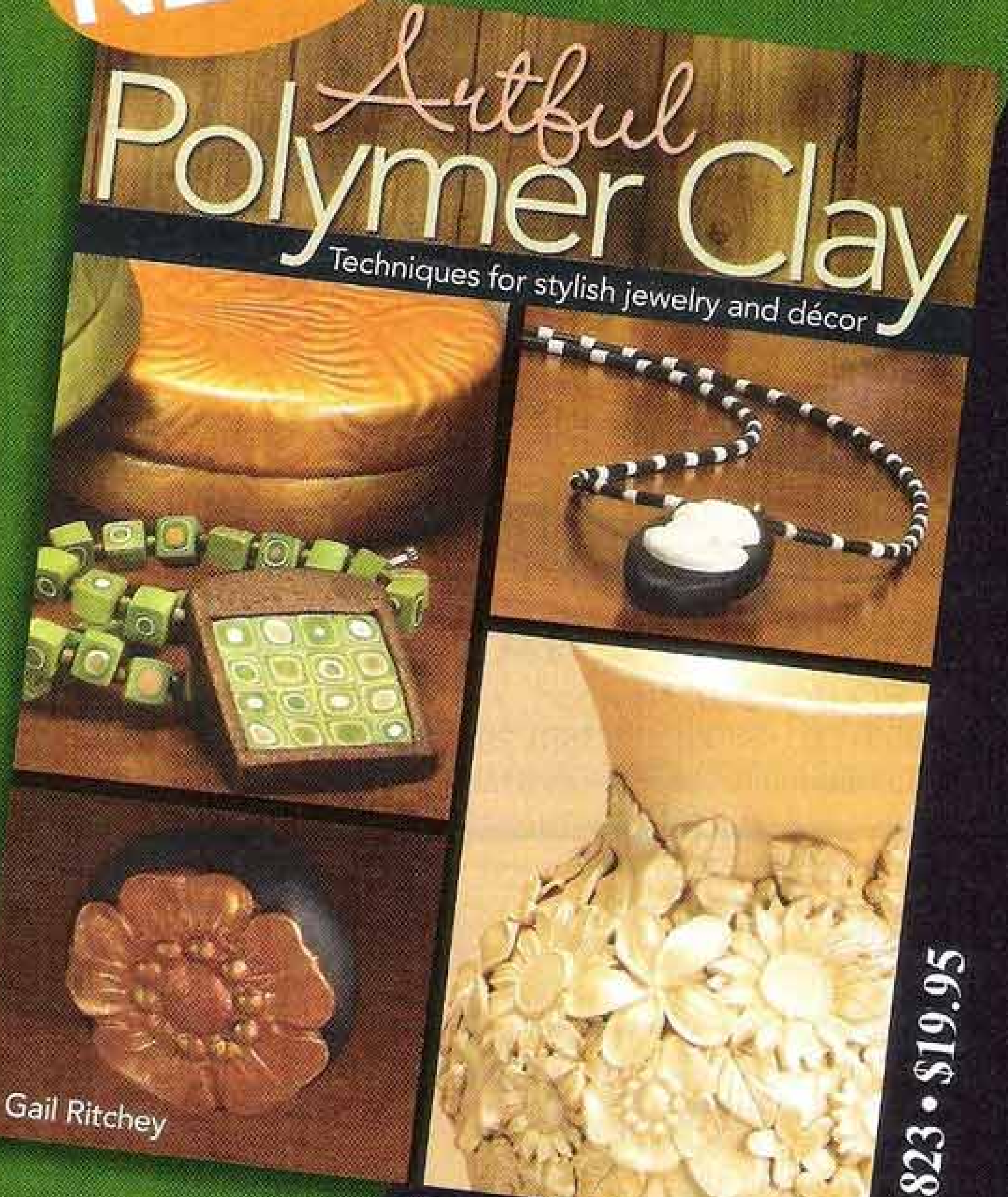
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Reducing Friction in the Studio

by Christopher Darway

Just one more hour and three high school boys would be at the Jersey shore for the weekend. Brownie was piloting the ancient '49 Plymouth while Jimmy and I kept an eye on the rising water-temperature gauge. An ever-thickening cloud of blue smoke followed us. We paid the toll and Brownie let out the clutch, with the idea to coast down and off the Garden State Parkway. The car sounded like a cement mixer filled with steel marbles. A large bang from the motor was followed by the squeal of locking rear wheels and then … silence. We had successfully welded an engine into a solid mass of iron without the aid of a torch.

What happened? The engine overheated and seized for lack of lubrication. Why? Without water to keep an engine under 260°F (127°C), oil temperatures rise at an accelerated rate. Now the oil must reduce friction and dissipate heat at the same time. Reciprocating parts expand and grind against each other. Oil turns to carbon (coke) at high temperatures, and the engine locks without oil to smooth its motion.

In the jewelry studio, smoking oil can be useful: I know a preheated ingot mold is hot enough (600°–800°F/315°–427°C) and ready for a pour after I apply oil to the mold and the oil smokes. This coked oil also produces a reduction atmosphere for the molten metal. Great for casting, not for driving. The 1949 Plymouth? We pulled the plates, left it on the side of the road, and hitchhiked to the shore. We were picked up by three nice young ladies in a brand new Pontiac Bonneville. Life was good back then.

Types of lubricants

All lubricants, no matter what type, pretty much do the same thing: Reduce friction between two hard surfaces. On a smaller scale, the molecules of oil act as ball bearings. Besides lubricating tools, almost all of the following products will protect the surface of a metal object from rust.

▼ An antique English oiler from the author's studio.

I keep many types of lubricants in my studio. Some petroleum-based oils include WD-40, 3-in-One oil (invented in 1894), used motor oil, and kerosene. Common organic lubricants are beeswax and olive, peanut, lavender, and wintergreen oils. Then there are other lubricants, like Silicone, Teflon, and graphite.

Petroleum-based lubricants

WD-40 stands for "water displacement, 40th attempt." It's a low-viscosity (thin) oil that comes in a spray can. It's a good all-around oil for preventing rust on tools and metal surfaces. I have heard from metalsmiths in Florida (and other damp places) that they don't use WD-40 on metal surfaces because it attracts moisture.

3-in-One oil is the old standard shop/home do-it-all lube. Put some on a rag and wipe your tools down to protect them. It's also my choice for electric motor bearings. At the top of your flex shaft, there's a small hole; that's for oil. Most tumbler motors also have a small indentation on either side. Apply a few drops of 3-in-One oil to your motor, and you're good for 6 months of tumbling.

lubricating molds

- **Lubricants are called "mold release" when used on RTV (room-temperature vulcanizing silicone), natural rubber, plaster of paris, or polymer molds.**
- **Silicone spray can be used on almost any mold material.**
- **DO NOT use mineral oil on natural rubber molds.**
- **Dust lost wax rubber molds with talcum power between injections.**

Types of greases

The difference between oil and grease is viscosity; greases are made by adding thickeners to oils. For the shaft of my flex shaft, I use bearing grease rather than oil. Oil will work its way down the shaft that's inside the rubber casing and accumulate where the handpiece meets the shaft, causing a mess when you're switching handpieces. You can buy bearing grease in small jars at any local auto-supply shop. This grease is also good when you want the lubrication to stick to the surface, such as when you're drawing wire.

White lithium grease is a special formula that clings to a surface, resists being washed away with water, and takes heat. Use this on gears, threads on a vise, and flat surfaces. It comes in spray cans, jars, and cylindrical cartridges for cute little grease guns.

Penetrating fluid

It's also good to have a can of penetrating oil or penetrating fluid on hand for use on stubborn nuts, bolts, stuck parts, or stiff tools. Spray the fluid on a stuck part, then gently tap it with a hammer so the vibration carries the fluid between the stuck parts. Wait a bit, then repeat. Kerosene is also good for this purpose.

Also, if you soak tools in kerosene and leave them to dry, the kerosene (also called "paraffin oil") will form a coating of paraffin wax on the

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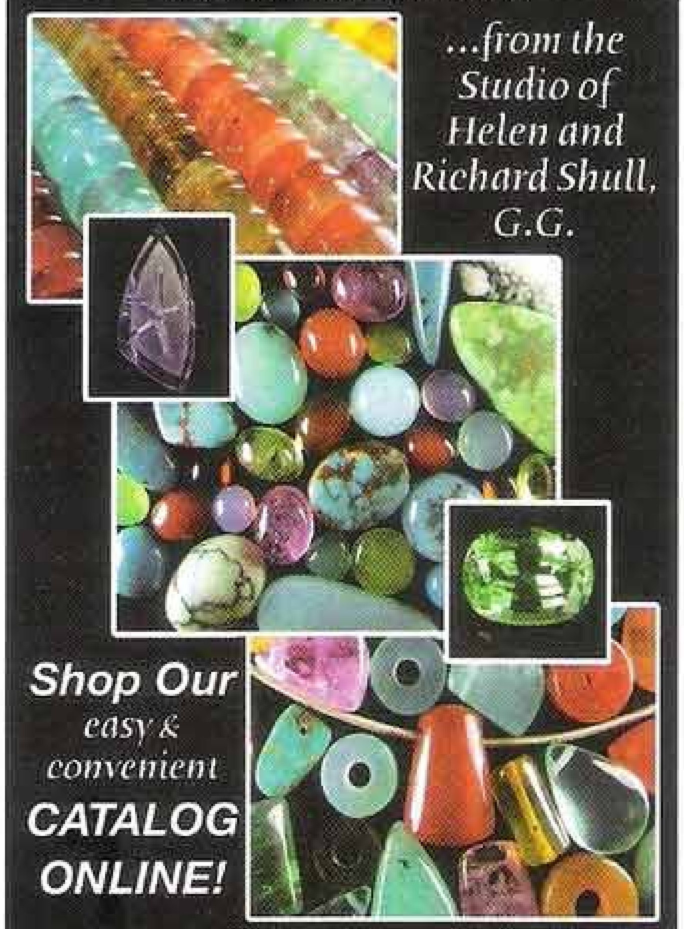

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what lubricant for what job?

- **3-in-One oil: flex-shaft and tumbler motors**
- **Bearing grease: shaft of flex shaft; drawplates**
- **Beeswax: saw blades, screw threads**
- **Graphite powder: gears of plastic hand drill**
- **Kerosene: stuck/stubborn nuts, bolts, parts, tools**
- **Tap oil: burs, drill bits**
- **Teflon spray: table saw and saw blade**
- **WD-40: preventing rust**
- **White lithium grease: gears, vise threads**

3-IN-ONE
OIL
SILICONE SPRAY
CRAFTSMAN

surface of the tools, protecting the metal from rust. I restored an old Wilton vise that was frozen by soaking it in a bucket of kerosene for 6 months. I've been using it in my studio for 25 years.

Lubrication for cutting tools

Friction equals heat; heat will cause the cutting edge of a tool to lose its temper and stop cutting. If you see small whiffs of smoke coming off your drill bit, it's over for that tool. Don't send your #60 drill bit or Krause bur to an early grave because you were too lazy to apply a small amount of lubricant!

I find that waxy bur products load up in saw teeth and burs, so I keep a small container of tap oil mounted on my bench. I dip all of my burs and drills into the tap oil while working. Tap oil, formulated for use in tap and die work, has the ability to simultaneously shed particles of metal from cutting edges, cool, and lubricate. I use tap oil when sawing tool-steel blanking dies and when sawing titanium. Pick some up at a local Sears tool department.

Dry lubricants

I include the versatile beeswax in the "dry lubricants" group. Rub beeswax on your saw blade before cutting. You can also rub beeswax on a screw before screwing it into a piece of wood. (Ivory soap also works well on screws.) If your bench drawer sticks, rub some beeswax on the runners.

I'll use Teflon spray on any surface that oil might stain. Teflon goes on the metal surface of my table saw and on the saw blade itself when I'm cutting wood or plastics. It extends the life of the blade.

Graphite powder is good when you have dissimilar materials rubbing together. I use graphite powder to dust the gears on my small plastic hand drill; some oils might start to dissolve or otherwise damage plastic. Old lace factories used graphite powder instead of oil to lubricate their machines. Oil would stain the fabric, while the graphite could be washed away with water without damaging the lace.

Remember, "If the metal is smoking, the oil is coking!" AJ

Christopher Darway has been working in metals for over 30 years as a designer, teacher, and artisan. Born in Brooklyn, N. Y., and raised in New Jersey, he received a B.F.A. from the Philadelphia College of Art. He has sold and exhibited work through galleries, shops, and craft shows. His work has been exhibited in Germany, Japan, and England. He is a master lecturer in the crafts department at the University of the Arts in Philadelphia and is the new president of the Pennsylvania Society of Goldsmiths. He is a senior instructor for the Rio Rewards program.

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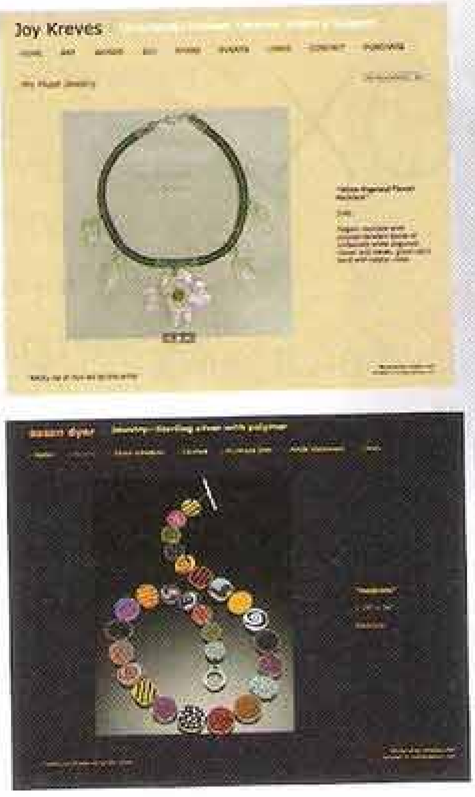

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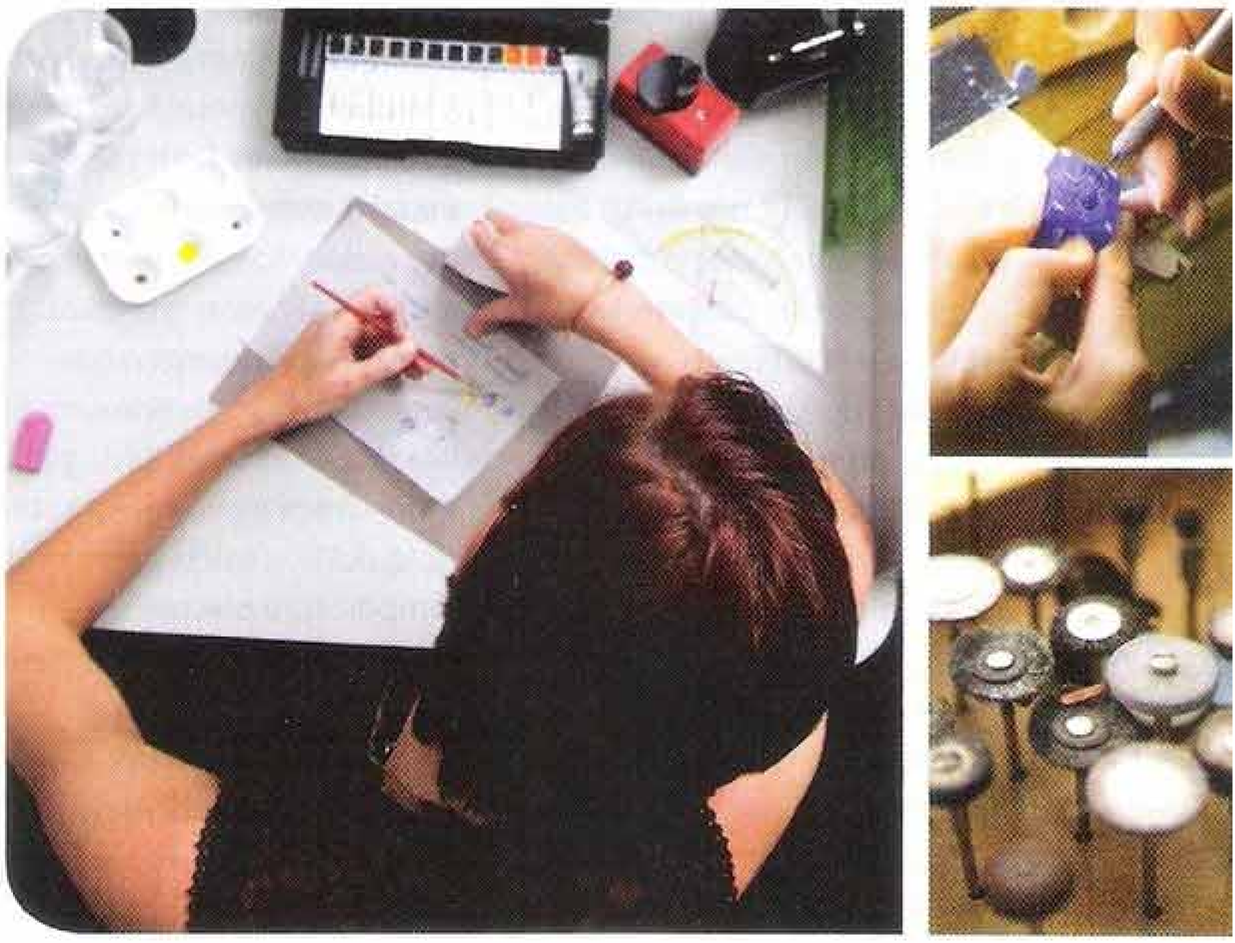

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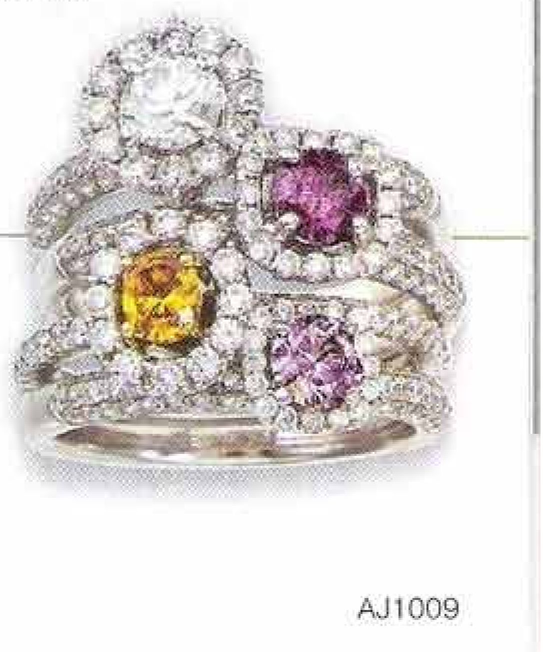

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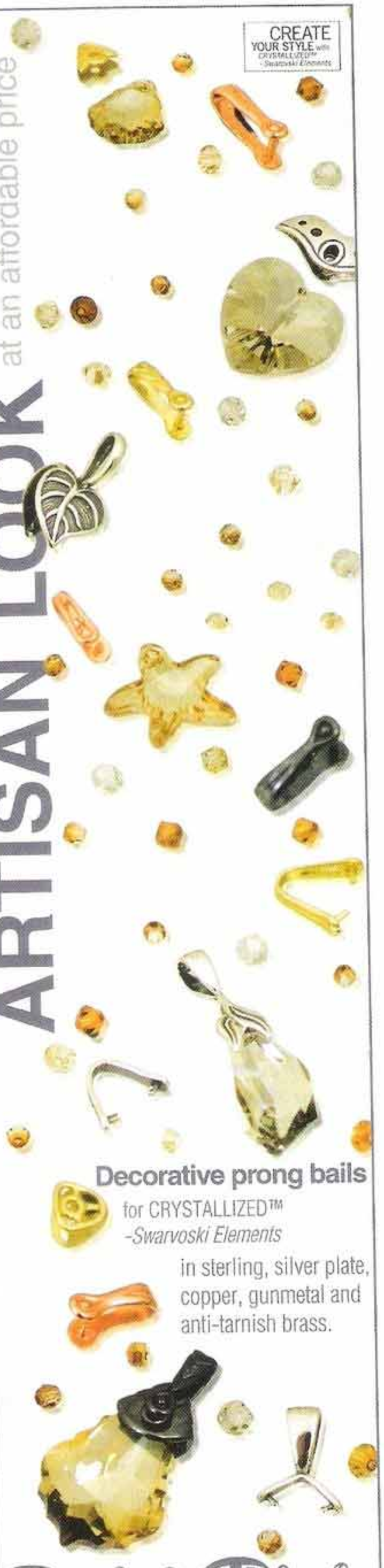
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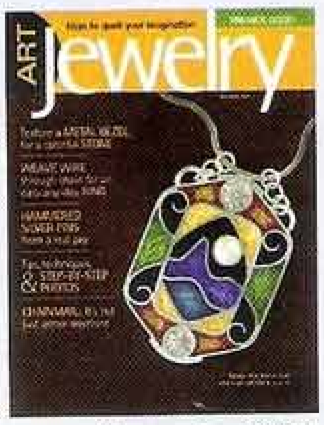
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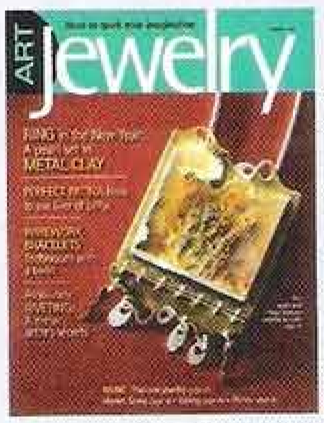
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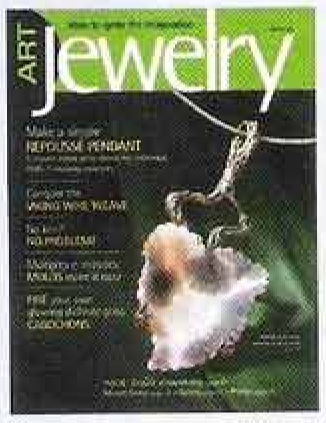
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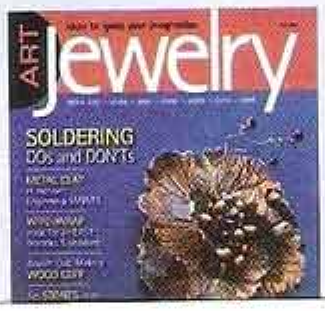
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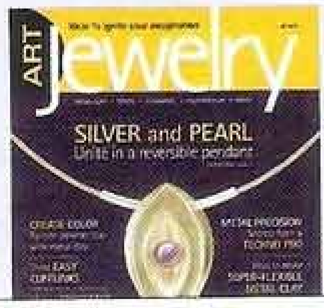
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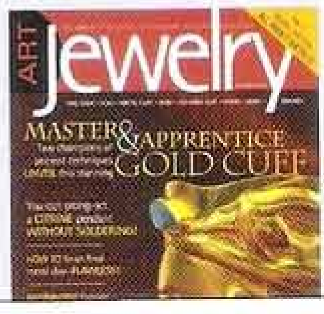
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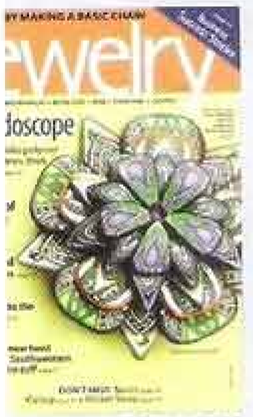
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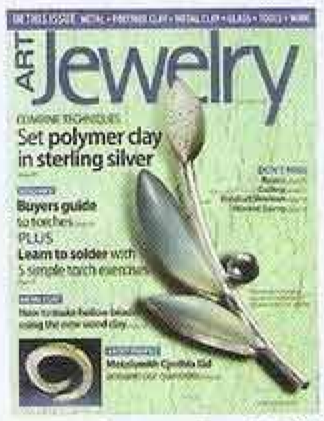
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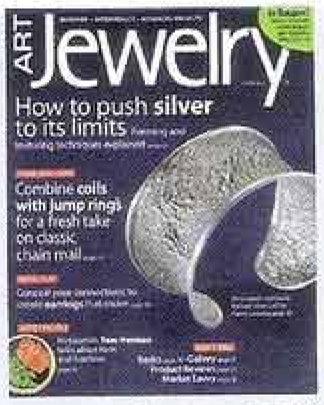
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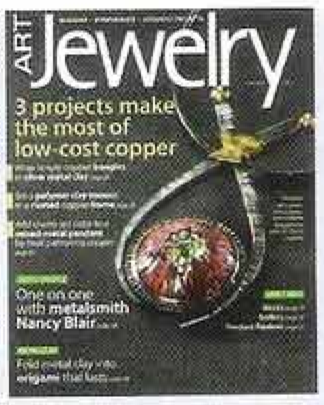
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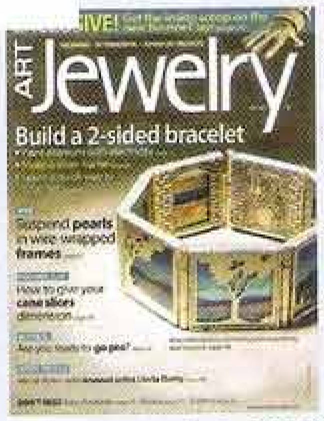
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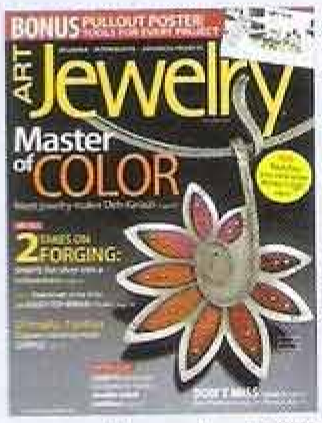
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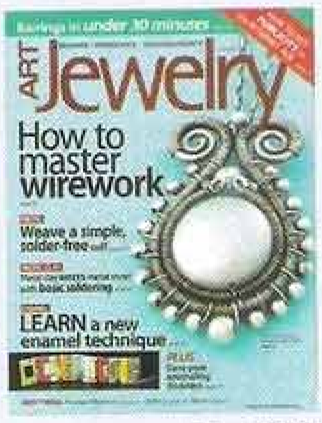
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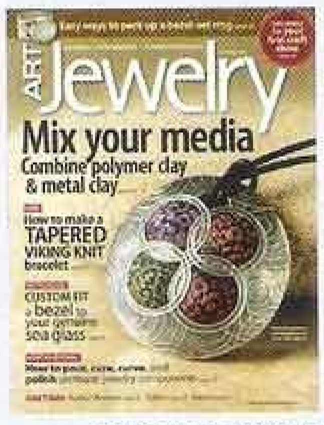
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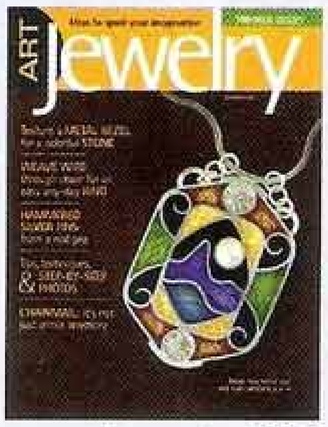

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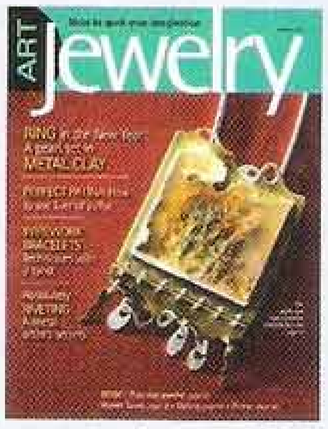

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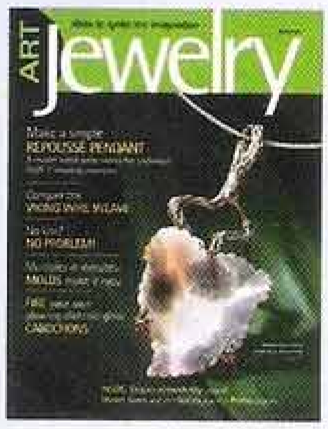

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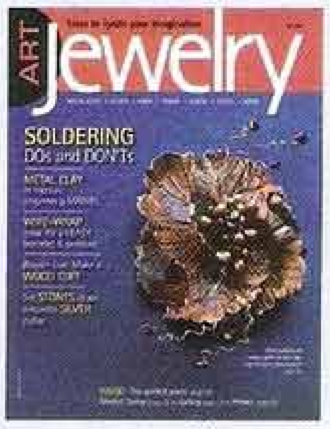

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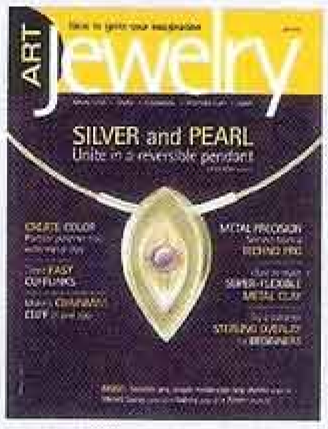

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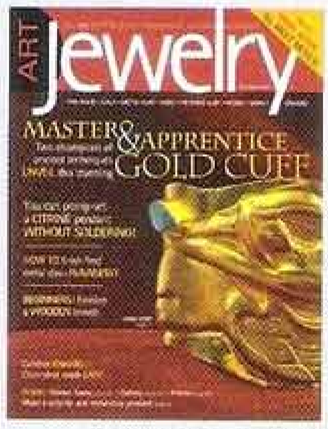

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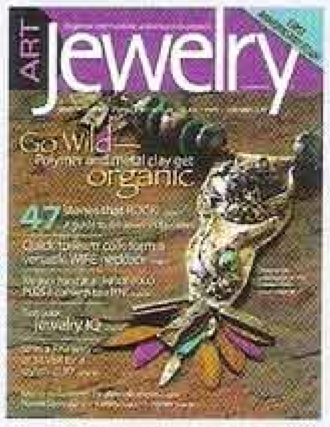

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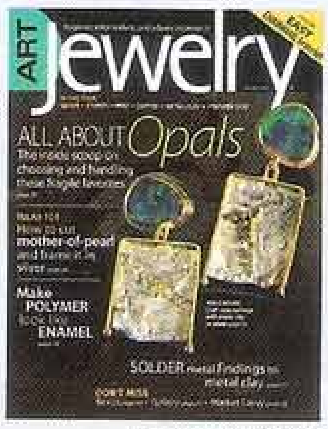

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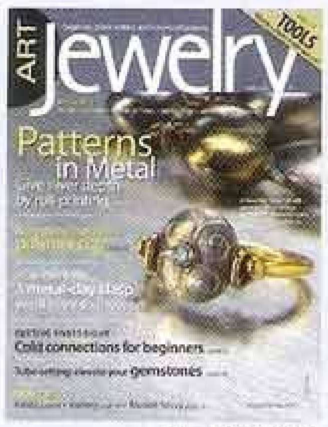

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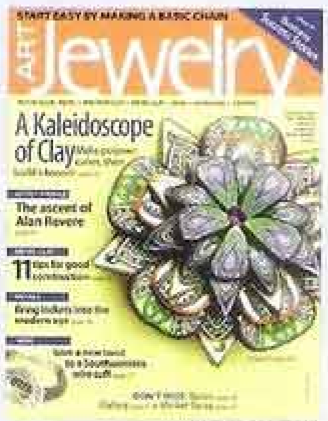

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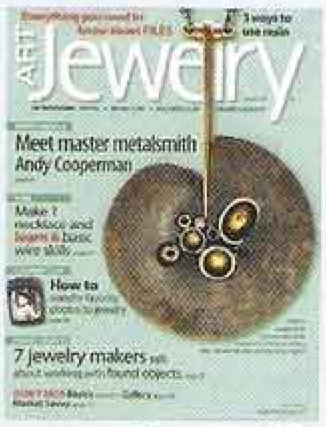

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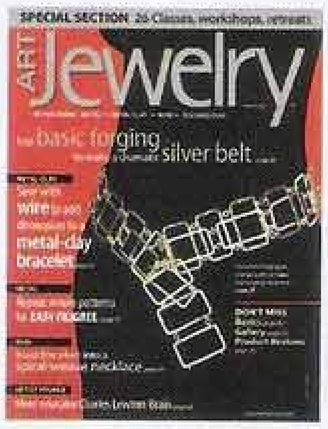

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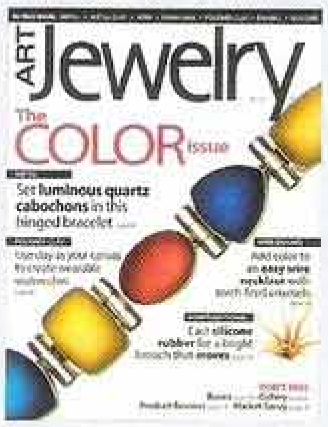

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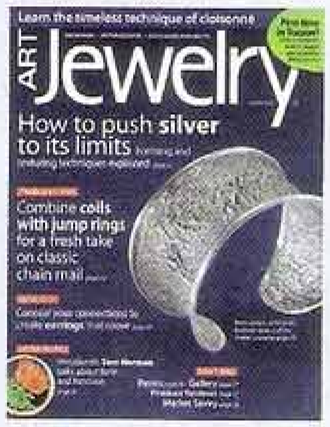

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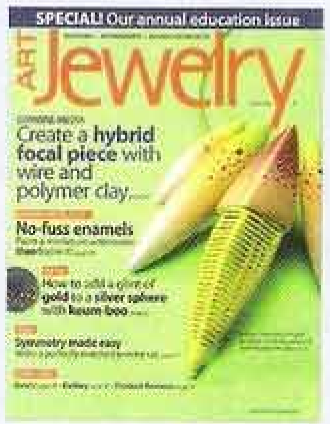

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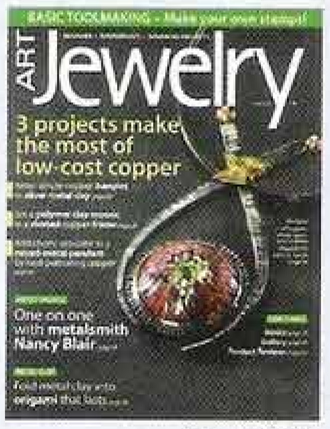

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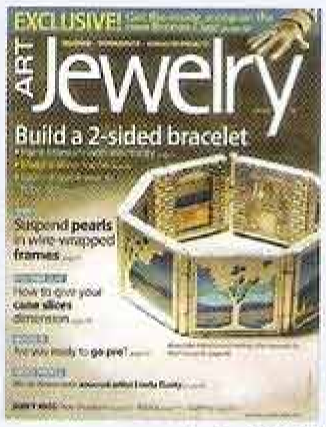

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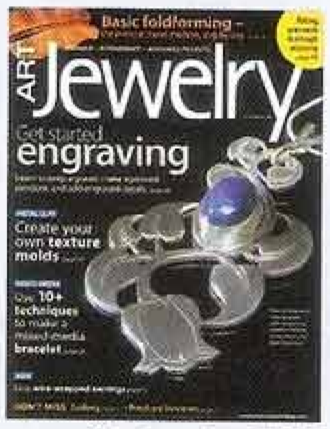

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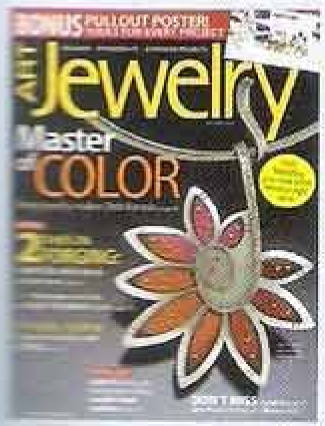

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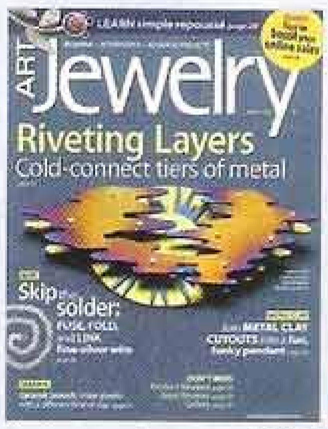

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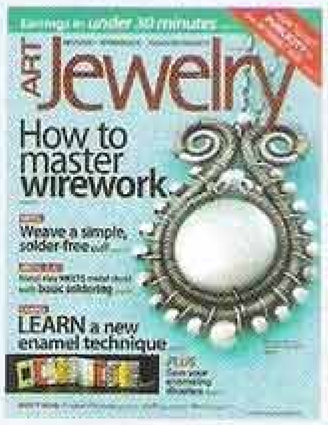

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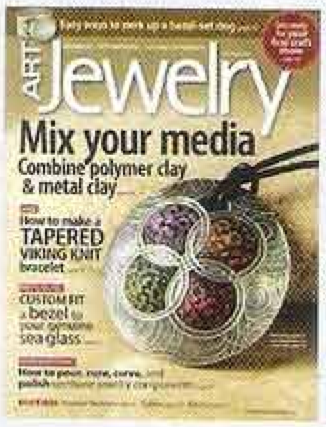


September 2009

Shape Silver Tubing to Replicate Bamboo

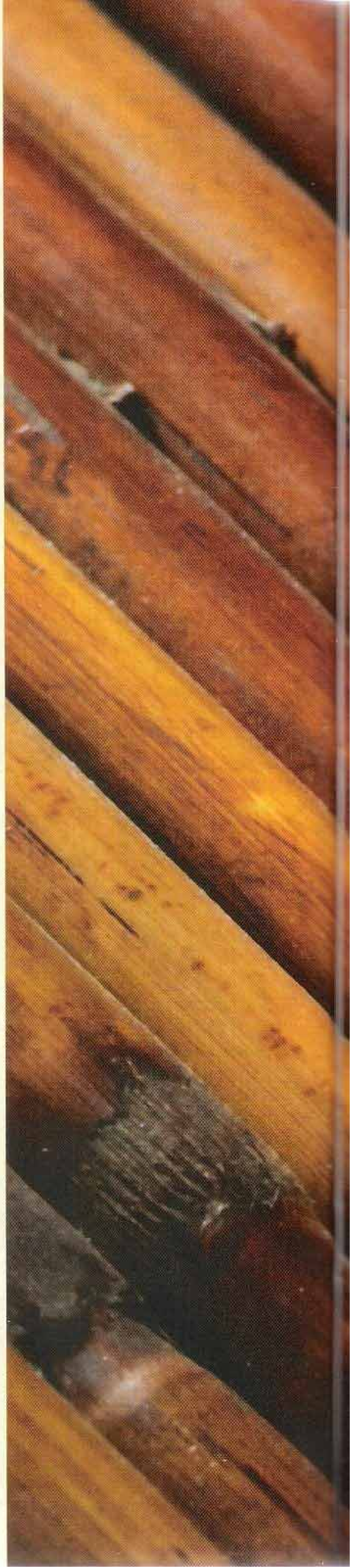
Think it's cast? Think again!

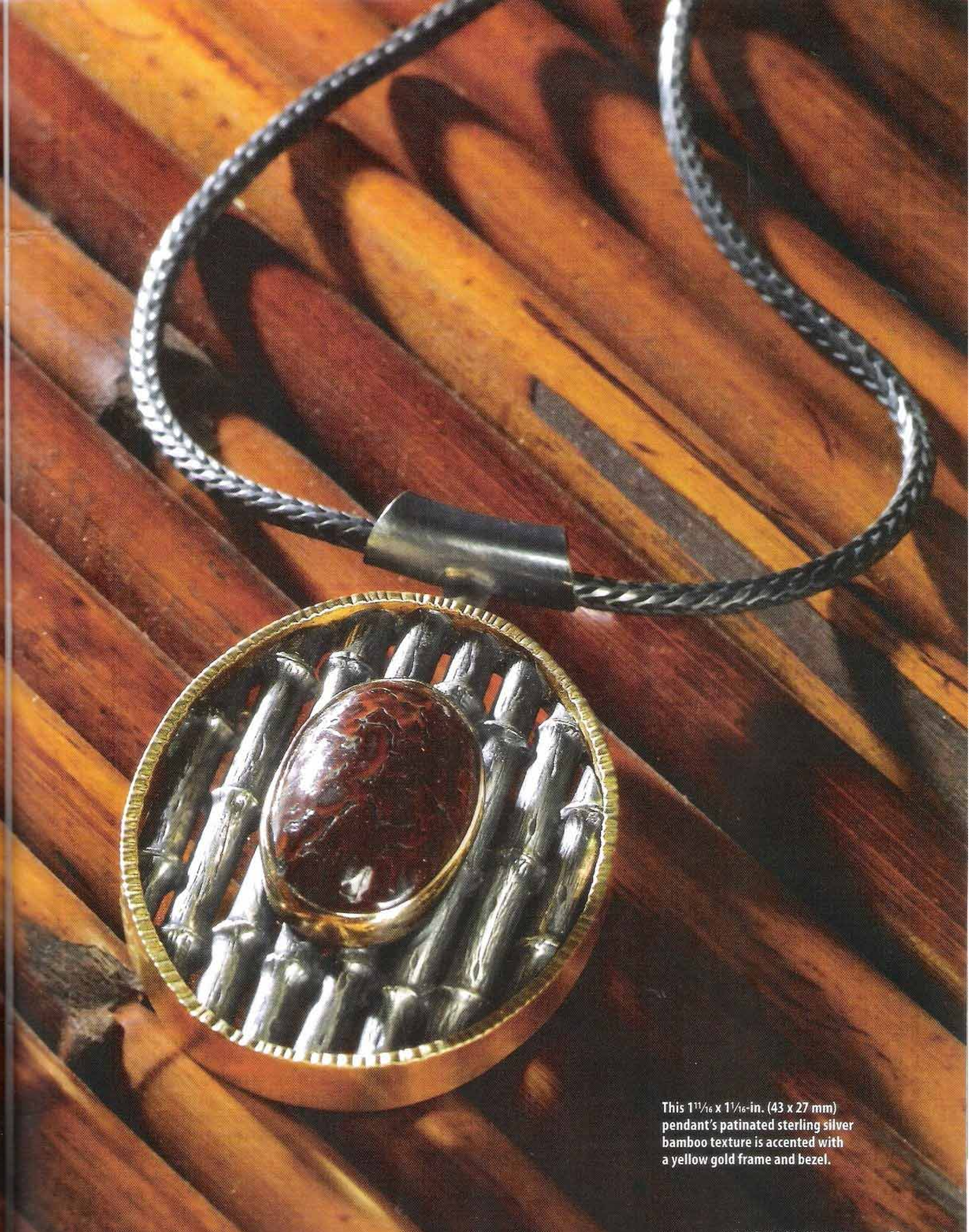
Use just your bench tools to make this pendant.

by John A. Sartin

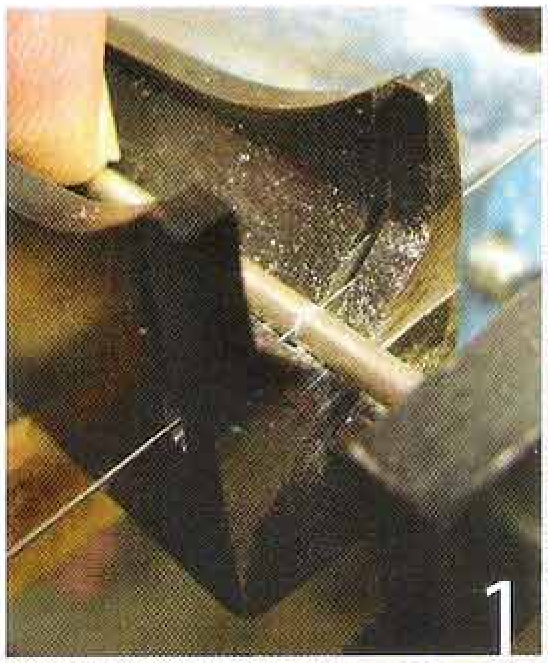
At first glance, you might think that the bamboo motif in this pendant is the result of casting. But it doesn't require casting equipment or an arrangement with a casting house to re-create the bamboo look; bench tools are enough to transform silver tubing into convincing bamboo replicas.

In this project, I'm working with sterling silver, 14k gold, and fossilized dinosaur bone to craft a pendant with a contemporary yet antique feel. If you wish to, you can also shape and polish your own cabochon focal stone, using relatively inexpensive machinery. See "Cut Your Stone," *page 45*, to learn how.





This $1\frac{11}{16}$ x $1\frac{1}{16}$-in. (43 x 27 mm) pendant's patinated sterling silver bamboo texture is accented with a yellow gold frame and bezel.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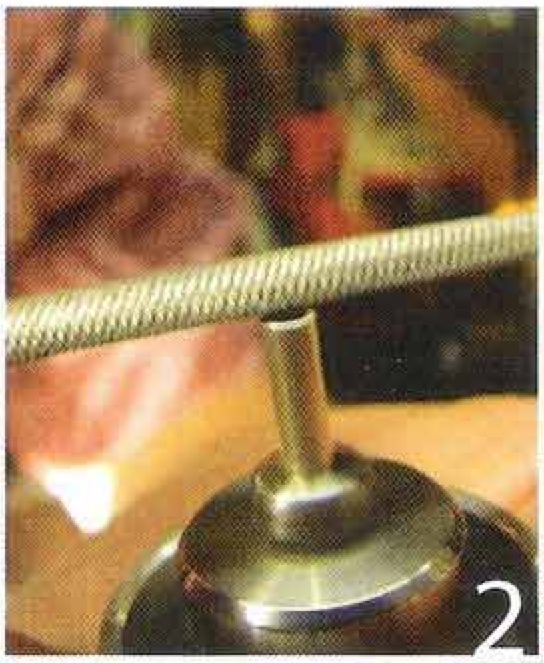
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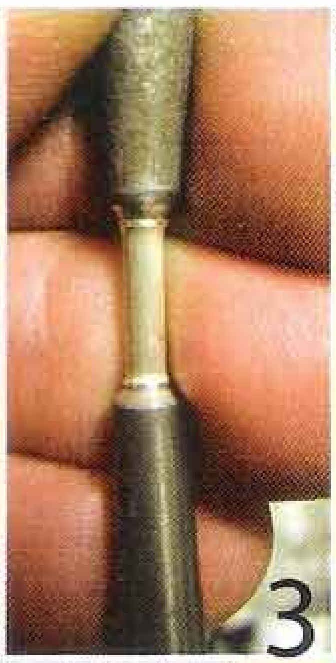
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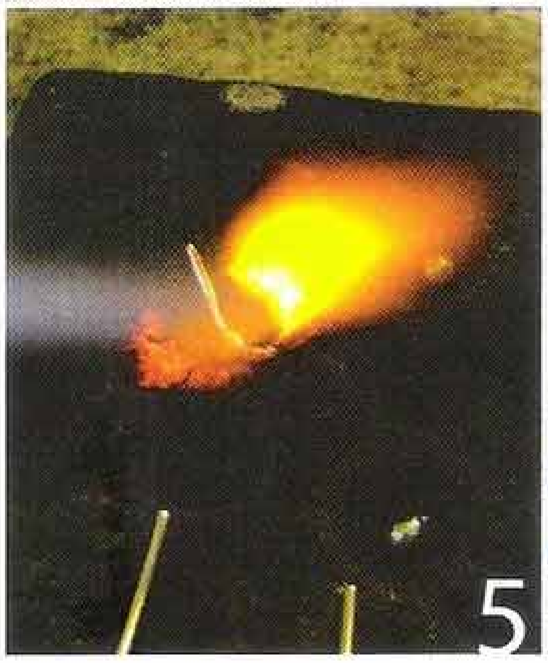
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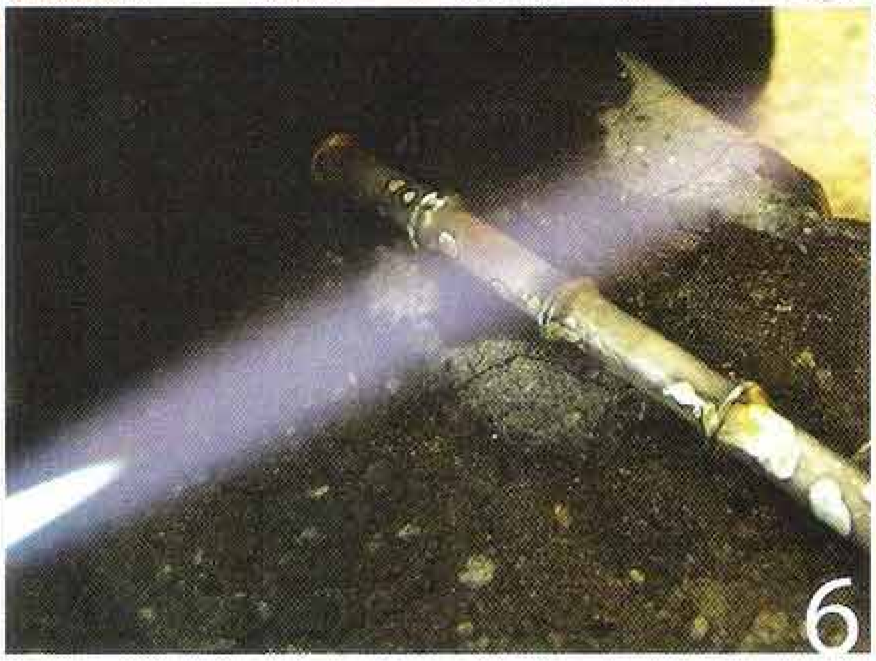
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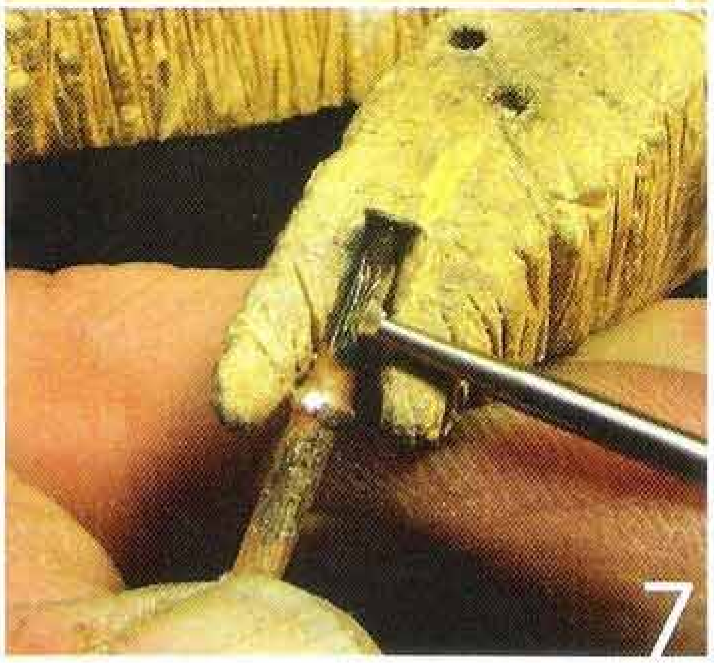
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Part 1: Bamboo

Cut the tubing. Use a tube-cutting jig and a jeweler's saw with a 4/0 blade to cut 3 mm outside diameter (OD) tubing into 30 tubes of 12 mm (½ in.) each **[1]**.

File the tubes. Insert a tube into the handpiece of your flex shaft. Make sure that the tube is straight and centered. Run the flex shaft at medium speed, and use a hand file to file the end of the tube square. Then tilt the file to put a slight bevel on the outer rim of the tube **[2]**.

Repeat to file and bevel the other end of the tube. You can also use a sanding stick to sand any imperfections in the tube at this time. Repeat to file and bevel the rest of the tubes.

Flare the tubes. Secure a center punch, pointed side up, in a bench vise. Set a tube on the point. Set another center punch in the top of the tube, and apply light pressure to align the tube and punches.

Strike the top center punch with a utility hammer just hard enough to slightly flare both ends of the tube **[3]**. You may find this awkward at first, but you will get better with practice. Repeat to flare all the tubes **[4]**.

Make the connector spheres. Using a round bur in your flex shaft, create round depressions that are 8–10 mm (5⁄16–3⁄8 in.) across in a charcoal block.

Cut 20-gauge (0.8 mm) round sterling silver wire into 25–30 lengths of 15 mm (9⁄16 in.) each. Place one of the wires across a depression in the charcoal block, and use your torch to melt the wire into the depression, creating a sphere **[5]**. Repeat to melt all the wires into spheres.

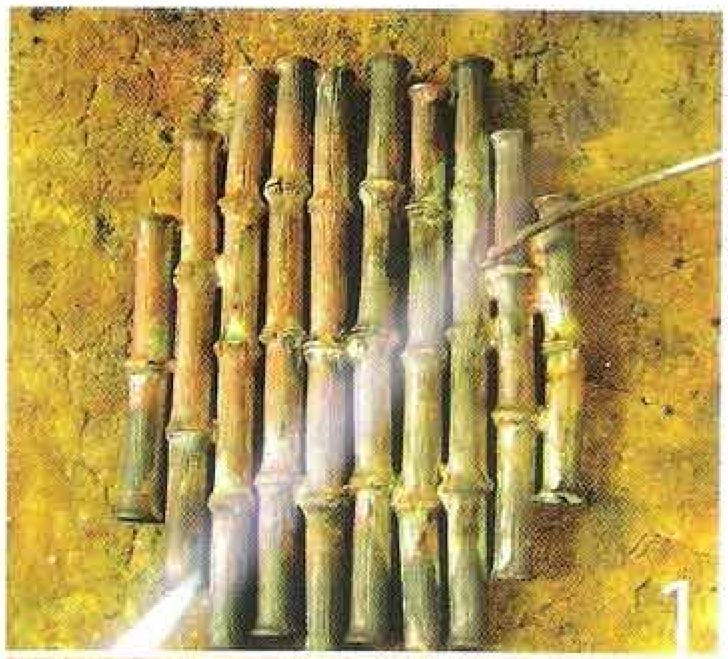
Make bamboo segments. File a shallow groove approximately 50 mm (2 in.) long in the charcoal block. Align four tubes in the groove, placing one connector sphere between each tube. Push the tubes and spheres together so that they're touching; the groove in the charcoal block will help keep the components straight and steady.

Solder B the tubes and spheres using hard solder **[6]**. Repeat to make a total of 6 bamboo segments with 4 tubes each, and 2 bamboo segments with 3 tubes each.

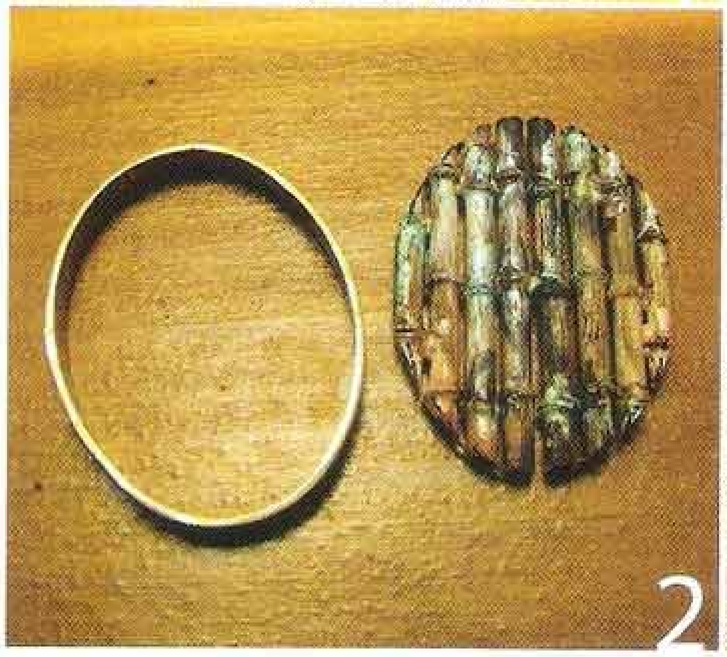
⚠ **SAFETY NOTE:** ***Do not quench or pickle the bamboo segments!*** Anything that is closed on both ends is extremely hard, if not impossible, to solder completely closed, especially when using flux. Even if a component appears to be completely sealed, there are microscopic holes in the solder, due to escaping air and moisture.

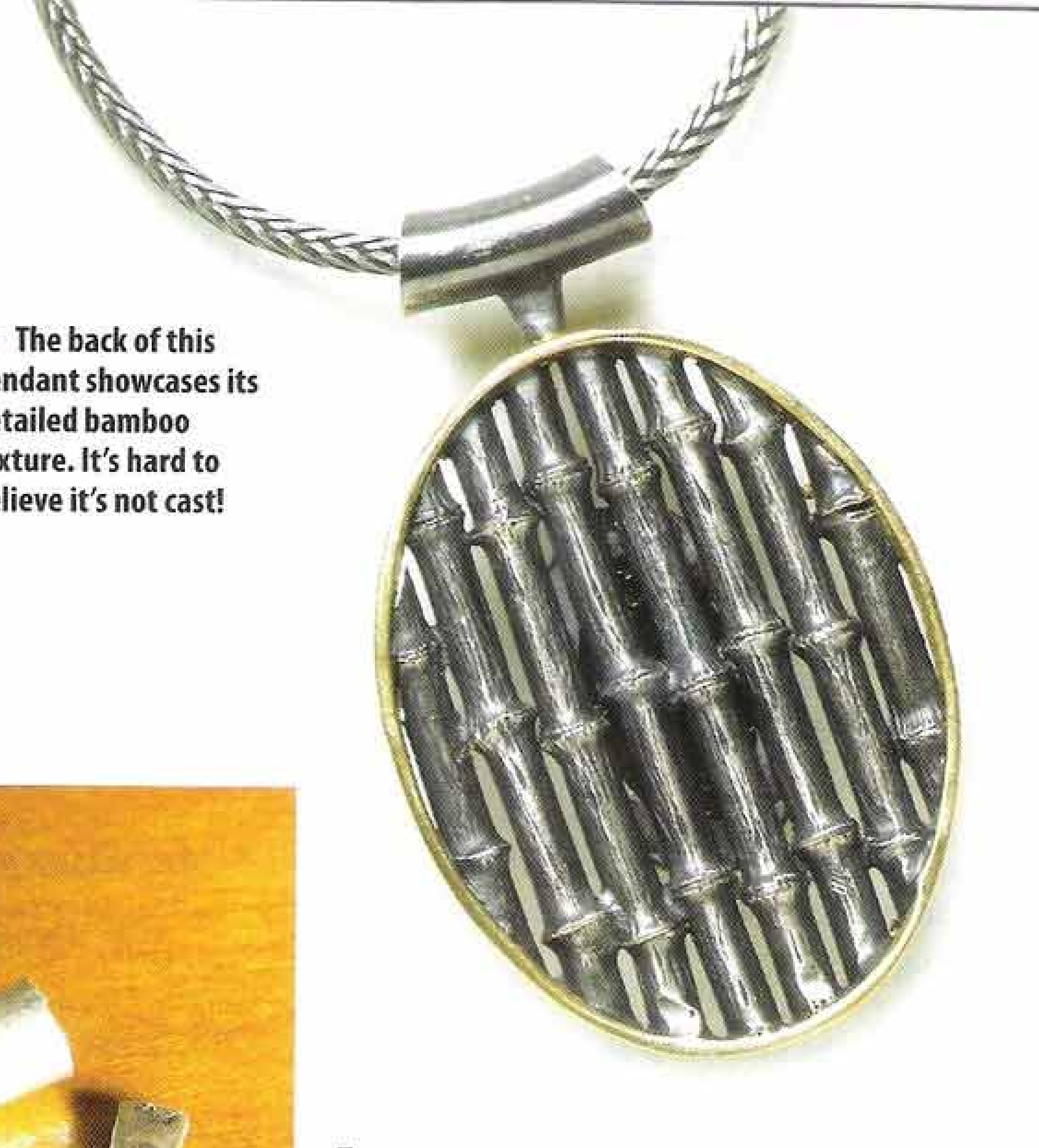
Quenching or pickling the piece will cause liquid to be sucked into the cavity, in effect creating a tiny pipe bomb that will ignite the next time you touch it with a torch. The moisture in the cavity will turn to steam, expand, and, in some cases, cause the piece to explode.

Carve the bamboo segments. Support a bamboo segment on your bench pin. Using the side of a Hart bur in your flex shaft, carve striations along the length of the bamboo **[7]**. This will not only add texture but also clean the piece of any firescale. Repeat for the remaining bamboo segments.



Process photos by John A. Sartin.





▶ **The back of this pendant showcases its detailed bamboo texture. It's hard to believe it's not cast!**

Part 2: Frame and bail

Solder the bamboo segments. Line up the bamboo segments side by side on a firebrick in a roughly oval shape. Use medium solder to solder the pieces together **[1]**. (The photo shows two extra two-segment pieces that I added to my panel; I found that these were not needed for the featured pendant.) *Again, do not quench or pickle the assembly.*

Cut out the bamboo panel. On scrap paper, draw an oval the size of your desired pendant and cut it out. Trace the oval onto the soldered bamboo segments. Use your jeweler's saw with a 4/0 blade to cut the bamboo assembly into an oval.

Use a wire brush or a radial bristle disk in your flex shaft to clean firescale off the bamboo panel to prepare it for soldering.

Make a frame. Measure the circumference of the bamboo panel. Cut a 4 mm (5⁄32-in.) wide strip of 20-gauge (0.8 mm) 14k gold sheet to that length. Solder the strip as if it were a bezel B ▣, using 14k yellow gold solder. Fit the frame to the oval panel **[2]**.

Make bail components. Bend a 20–30 mm (¾–1¼-in.) piece of 4.5 mm OD sterling silver tubing to give it a gentle curve.

TIP: There are several ways to curve tubing without crushing or crimping it: Pack the tube with sand or pitch; insert a lubricated smaller-diameter wire into the tube; or slide the tube into a heavy spring that fits around it snugly. Don't hurry — curve the tubing slowly!

Using your jeweler's saw, cut the curved tubing to about 12 mm (½ in.). Also cut a 4 x 4 mm (5⁄32 x 5⁄32-in.) piece of 18-gauge (1.0 mm) sterling silver sheet **[3]**.

Make the bail. Using hard silver solder, attach the 4 mm (5⁄32-in.) square piece of sterling silver to the underside of the curved tubing. File and refine the square piece as necessary, and set the bail aside.

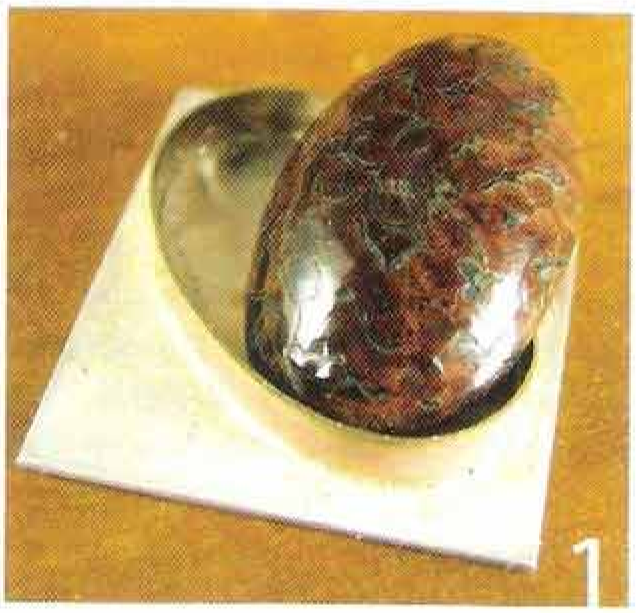
Part 3: Bezel cup

Make a bezel. Using jeweler's shears, cut a strip of 30-gauge (0.26 mm) 14k gold bezel wire long enough to make a bezel for your stone B ▣. Solder the bezel join using 14k yellow gold medium solder.

Add a backplate. Use hard silver solder to solder the gold bezel to a piece of 24-gauge (0.5 mm) sterling silver sheet that is slightly larger than the bezel **[1]**.

Using a saw with a 4/0 saw blade, cut around the bezel as close as possible, then file the edges smooth, and polish it.

Open the back of the bezel cup by piercing a hole; this will give you access to the bamboo piece when the bezel cup is set in place.



Part 4: Assembly and finishing

Solder the bamboo panel in the frame. Solder the bamboo panel inside its 14k gold frame, using medium solder. Let the assembly air-cool, then check your solder job. *Do not quench or pickle!* Use a brass brush or a radial bristle disk attachment in your flex shaft to remove any firescale.

Texture the frame. To add texture to the upper edge of the gold frame, position a small chisel, stamp, or punch on the frame, and strike the small tool with a utility hammer or mallet. Repeat this texture around the frame.

Attach the bezel cup and bail to the bamboo panel. Sweat easy silver solder onto the back of the bezel cup. Place the bezel cup in position on the bamboo panel, and check how the bezel cup fits against the bamboo surface. You may need to file down some of the bamboo ribs so the cup sits level.

Set the bail in position at the top of the frame, and place pallions of 14k gold easy solder at the join. Heat the entire assembly to solder both the bezel cup and the bail.

NOTE: Simultaneously soldering the bezel cup and the bail can be tricky because of the different melting points of the gold and silver solder, but if you solder the bezel cup first and then concentrate your flame on the bail, the heat carryover will quickly increase the temperature near the bail and the solder will flow at the join.

Check the solder joins and pickle the assembly. Let the assembly air-cool, and then check all of your joins. If the joins aren't complete, clean the area with a brass brush or a bristle disk in a flex shaft and then re-solder.

Let the piece air-cool, and then, if you are confident of your solder job and are *certain* you are finished soldering entirely, you can pickle the assembly. After pickling, let the piece sit in a sodium bicarbonate (baking soda) solution for approximately 30 minutes to neutralize the pickle. Then soak the piece in clean water for another 30 minutes.

Patinate the pendant. Prepare a warm liver of sulfur solution according to the manufacturer's instructions. Submerge the piece until the silver turns black (the patina will not affect the gold). Remove the piece from the patina solution and rinse it well.

In a small pot (preferably an enameled pot, used only for this process), place the piece in a weak solution of a pinch or two of sodium bicarbonate in clean water, and heat the solution to boiling; allow it to boil for 5–10 minutes. Remove the piece from the solution, clean the pan, and boil the piece again in clean water for at least 5 minutes. This process will neutralize any chemicals that may yet be in place.

Complete the finishing. With a bristle disk or any fine abrasive, begin removing some of the patina from the bamboo, revealing the carved striations. Work gradually; if you remove too much and have to repatinate the piece, you will have to repeat the boiling process.

Set the stone. Once you are happy with the patina on the bamboo, set the stone in the bezel B 🎞. Apply paste wax to the pendant according to the manufacturer's instructions. Multiple layers of wax will seal and enrich the patina and enhance the texture. AJ

Videos & Basics

Check out these bonus tutorials for fundamental techniques used in this project:

- Soldering B
- Making a bezel and bezel-setting a stone B 🎞

B Basics, *page 87*
🎞 Videos, www.artjewelrymag.com/videos

materials

- Sterling silver tubing: 22-gauge (0.6 mm) wall thickness:
  - 3.0 mm outside diameter (OD), 38.4 cm (15 in.)
  - 4.5 mm OD, 20–30 mm (¾–1¼ in.)
- Sterling silver sheet:
  - 24-gauge (0.5 mm), 22 x 15 mm (7/8 x 9/16 in.)
  - 18-gauge (1.0 mm), 4 x 4 mm (5/32 x 5/32 in.)
- Sterling silver wire: 20-gauge (0.8 mm), round, 50 cm (20 in.)
- 14k gold sheet: 20-gauge (0.8 mm), 4 mm (5/32 in.) wide; length to fit bamboo panel (about 12 cm/5 in.)
- 14k gold bezel wire: 30-gauge (0.26 mm), size to fit cabochon
- 14k yellow gold solder: medium, easy
- Cabochon: fossilized dinosaur bone or other, 18 x 11 mm (11/16 x 7/16 in.)

toolboxes, *page 88*

- Soldering
- Bezel setting
- Sawing/piercing
- Finishing

additional tools & supplies

- Tube-cutting jig
- Burs for flex shaft: round, Hart
- Bench vise
- Utility hammer
- Bench vise
- Wire brushes or bristle disks
- Small chisel, stamp, or punch
- Baking soda
- Paste wax

See Suppliers, *page 93*
See Safety Basics, *page 89*

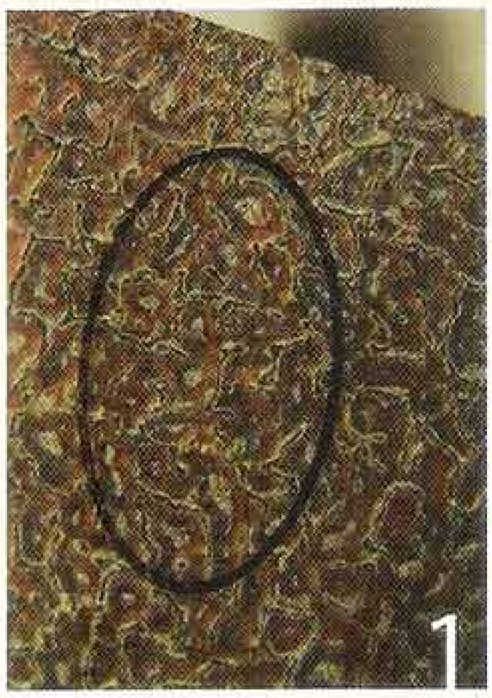
▼ A side view shows the marvelous mix of colors and textures in the finished pendant.

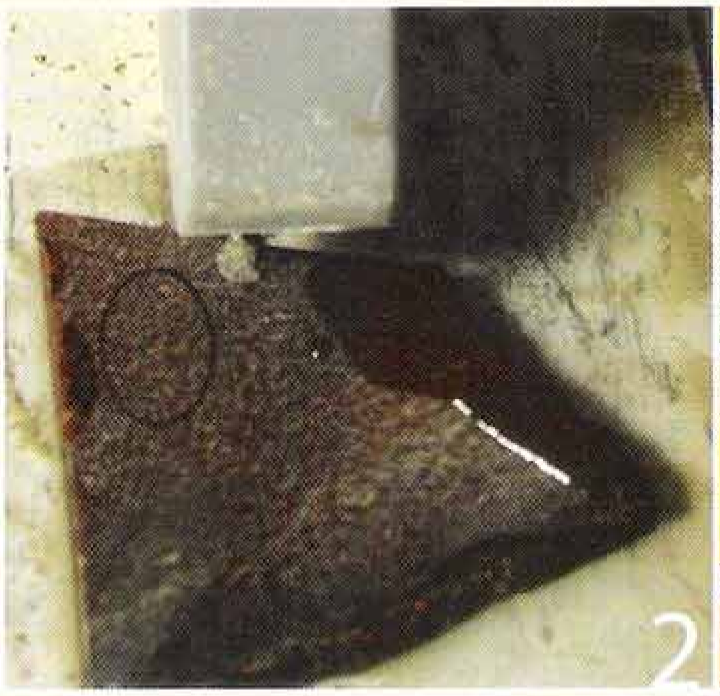
Cut Your Stone

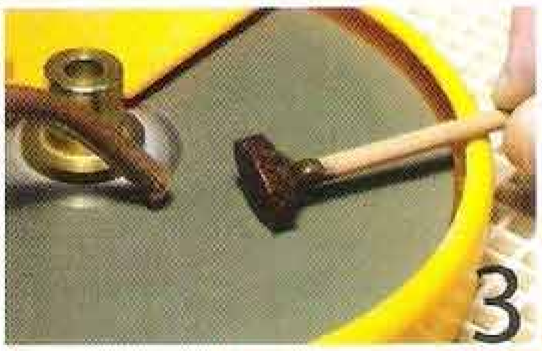
by John A. Sartin

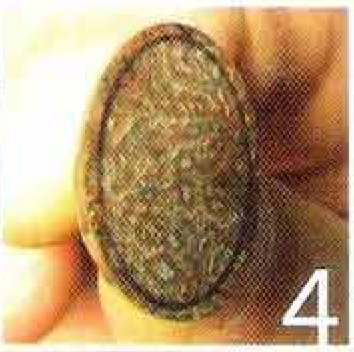
Use basic lapidary equipment and learn how to cut your first cabochon.

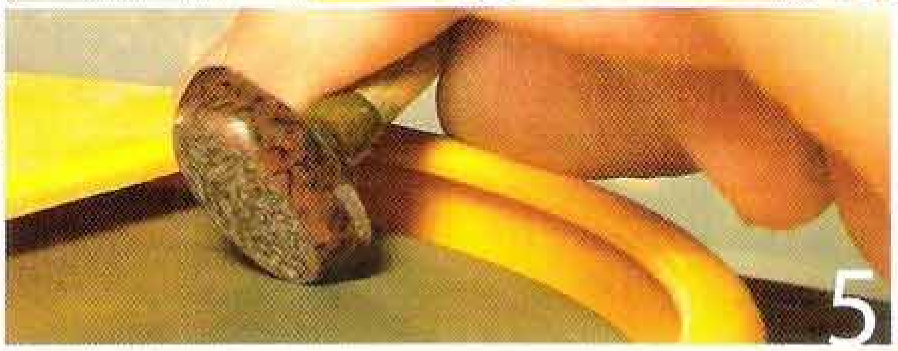
Cutting and polishing your own stones can open up a lot of design possibilities. And yet, for a long time I resisted forming my own stones; lapidary equipment was just too expensive. Recently, however, some machines have come on the market that are reasonably priced for light lapidary work and perfect for the beginner. The combination unit I purchased converts from trim saw to grinder/shaper to flat-lapping/polishing operation pretty easily. (If this terminology is new, see "Let's Talk Lapidary," *page 46*.) I started by cutting rocks I found around the house — free rough, right in my driveway! After I learned on free rocks, I felt confident progressing to economy rough stones and eventually on to more expensive gems.











Process photos by John A. Sartin.

Prepare the rough. Most gem and mineral suppliers have rough stone already slabbed in varying thicknesses; select the thickness closest to your desired final stone height to avoid unnecessary grinding.

Determine the size you want your finished stone to be, and use a template to draw that size oval directly onto the rough stone **[1]**.

Cut the preform. Using a water-lubricated trim saw, roughly cut away the excess slab stone from the oval shape **[2]**.

NOTE: Do not press too hard; let the blade do the work. Trim saws only cut in straight lines, so you may need to make several cuts from different angles to remove the excess stone.

Attach the stone to a handle. (This is called "dopping the stone.") Dopping wax is a hard wax that melts at 160° F (71° C). While easily removable, it securely holds your stone on a wooden dowel, or "dop stick," which provides you a firm grip for grinding and polishing.

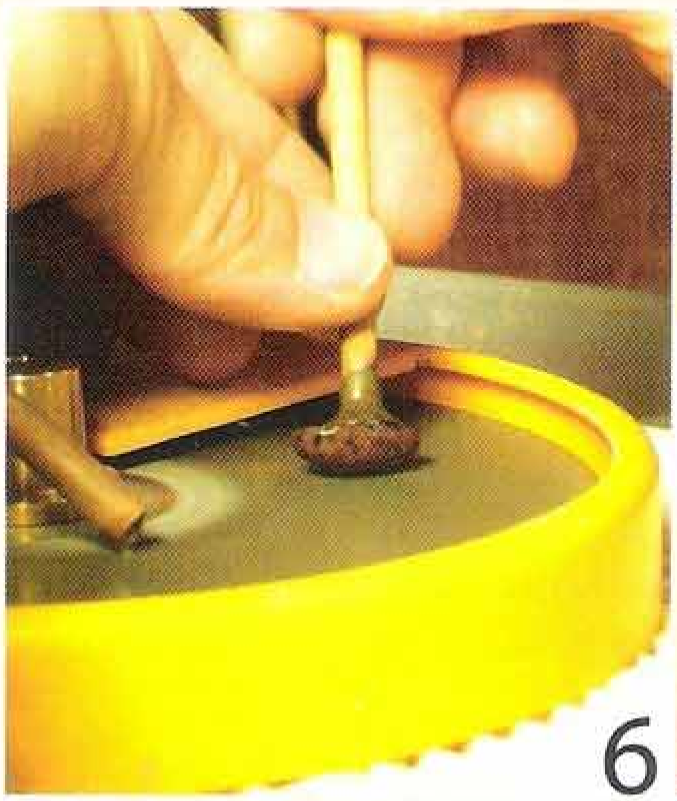
You can use an alcohol lamp or a dop pot (an electric container used to keep wax warm) to warm the dopping wax; warming the stone slightly as well will ensure good adhesion.

Melt the wax onto one end of a dop stick. While the wax is still warm, press the back of the stone to the top of the stick. Make sure the stone is both perpendicular to and centered on the stick. Hold the stone in place until the wax has cooled and is gripping the stone.

Shape the edges of the stone. Using a water-lubricated 170-grit flat lap or grinding wheel on a lapidary machine, smooth the outside shape around the edges of the stone **[3]**. Do not grind all the way to the marked line **[4]**.

NOTE: In each step you will be removing material to achieve a smooth polish, so you don't want to remove too much material at first and end up with a stone that is half its intended size.

Dome the cabochon. Begin rounding the stone by softening the top corners. Hold the side of the stone against the lap or grinding wheel, angling the stone so that the corner is against the wheel. Rotate the stone as you work to avoid flat spots **[5]**.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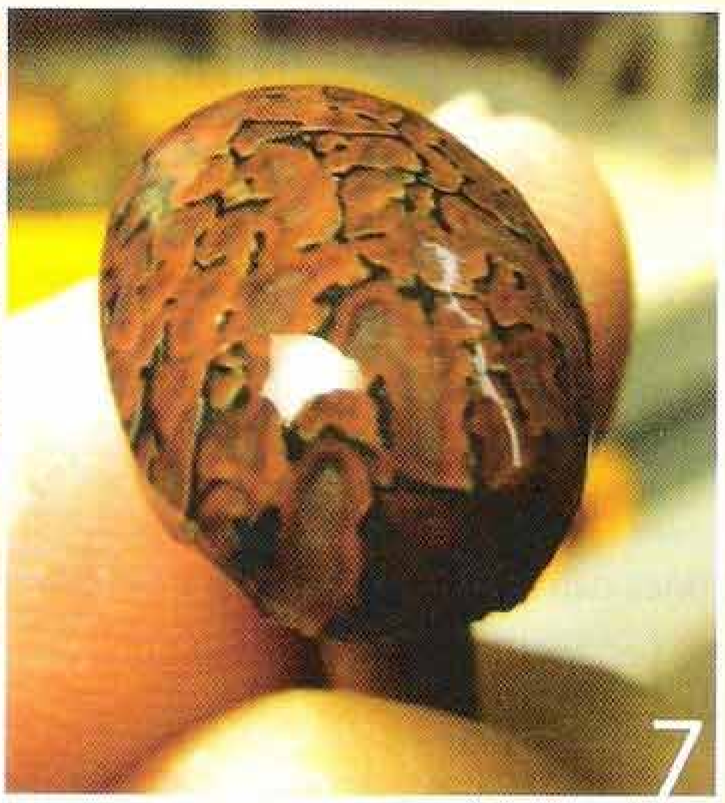
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materials

- Slab of fossilized dinosaur bone or other rough stone

tools & supplies

- Oval or round cabochon templates
- Lapidary equipment: trim saw; lapidary machine with grinding wheels and/or flat laps in various grits (170-, 320-, 600-, 1200-grit); felt or leather polishing wheel or lap; polishing compound (cerium oxide or tin oxide)
- Wooden dowel or dop stick, dopping wax, dop pot or alcohol lamp

See Suppliers, *page 93*

Work around the stone, increasing the angle as you go. Continue until you've removed all corners and there is no longer a flat top to your stone; it should be a rough dome.

Refine the cabochon. Once the stone is roughed into a domed oval, change to a 320-grit flat lap and further refine the shape. Grasp the dop stick as shown **[6]**, and rock the stone back and forth against the flat lap. Stop and inspect the stone frequently to check your progress.

Once you're satisfied that the stone has a uniform finish, progress to the next finer-grit flat lap (600 grit) and repeat.

After you're done with the 600-grit flat lap, change to a 1200-grit flat lap, and continue to refine the surface. To test the surface of the cabochon, run your finger over it while it's still wet; you will feel when it is smooth.

Polish the cabochon. When you' are satisfied that the stone's surface is completely smooth, polish the stone, using a felt buff and the lapidary polishing compound of your choice to bring up a nice shine **[7]**.

Remove the dop stick. Once the front of the cab is finished, put the stone and dop stick in the freezer for a few minutes. When it has cooled, the stone will pop off the wax effortlessly.

Polish the stone's back. Reheat the wax on the dop stick, and attach the dop stick to the front side of the stone.

Grind the back of the stone to make it flat and level.

TIP: Bevel the bottom edge of the stone slightly; this will prevent the edges of the stone from chipping when you bezel-set it.

Refine and polish the back of the stone, following the same steps you used to polish the top. Remove the dop stick and clean off any stray dopping wax (you can chip it off cold or warm the wax up and wipe it off).

let's talk lapidary

EQUIPMENT

- **Slab saw** Large saw used to cut slices of rough rock into slabs
- **Trim saw** Small saw used to trim basic shapes from slabs
- **Lapidary machine** Machine that spins and water-lubricates grinding wheels, flat laps, and/or polishing wheels/laps that are used to shape and polish stones
- **Grinding wheel** Abrasive wheel oriented vertically in a lapidary machine; stone is ground against the wheel's circumference; wheels come in a progression of grits
- **Flat lap** Abrasive disk oriented horizontally or vertically in a lapidary machine; stone is ground against the flat side of the disk; disks come in a progression of grits
- **Polishing wheel/lap** Felt or leather wheel or flat lap that is charged with lapidary polish; used to shine stone
- **Combination machine/unit** Any combination of lapidary devices in one unit (e.g., a trim saw with grinding and polishing wheels)

TERMINOLOGY

- **Rough** Rock, stone, or gem that is raw, uncut, and unpolished
- **Slab** Large slice of rough rock
- **Cabochon (cab)** Stone that is cut and polished into a smooth dome; base can be any shape
- **Preform** Basic outline of a cabochon; cut from a slab
- **Lap** Both an abrasive lapidary disk and the verb for shaping a stone
- **Dop stick** Dowel or rod that holds stone during lapping and polishing
- **Dopping wax** Hard wax that holds stone on a dop stick
- **Dop pot** Electric container that warms dopping wax
- **Lapidary polish** A type of fine abrasive used with a felt or leather polishing wheel or lap to bring out the final shine on a stone; examples include cerium oxide and tin oxide

GALLERY

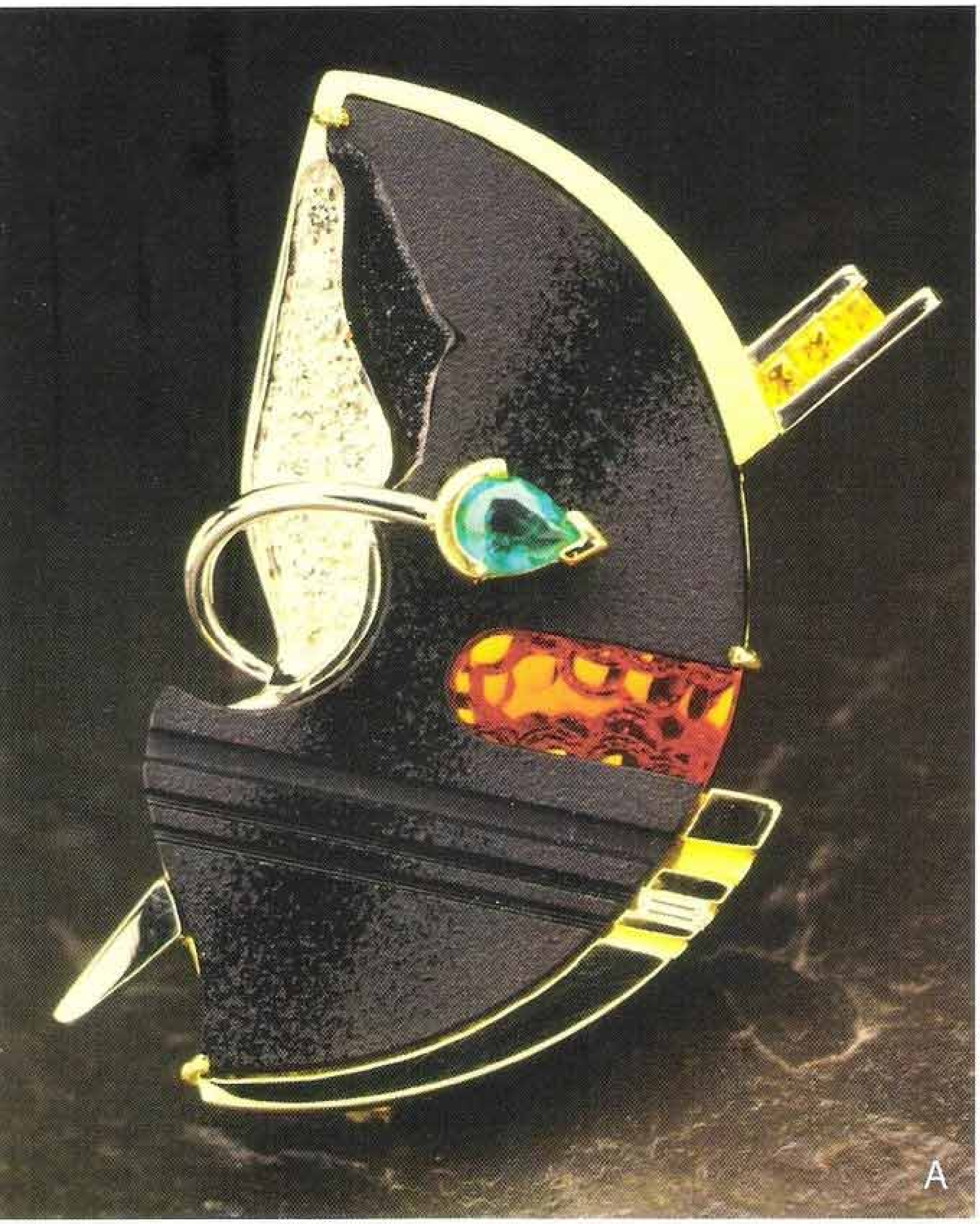
I find the great
thing in this world
is not so much
where we stand, as
in what direction
we are moving:
To reach the port of
heaven, we must
sail sometimes
with the wind and
sometimes against
it — but we must
sail, and not drift,
nor lie at anchor.
—Oliver Wendell
Holmes

[A] In his untitled pendant, David Liska showcases a black onyx drusy that was textured and inlaid with fire opal by Steve Walters. Liska used platinum, 18k gold, diamonds, and Paraiba tourmaline to create his design, which he handcarved, cast, and fabricated. Photo by John Parish.

[B] Tosca Hidalgo y Terán made *Perelandrian Ecdysial Instrument* from sterling silver and flameworked soda lime glass. The piece is part of a series based on C.S. Lewis' *Perelandra*, "…a misty world of strange desires, sweet smells, and delicious tastes…." Terán co-wrote a partial soundtrack for the installation; to listen, visit here: www.nanopod.tv/nano_future_relics.html. Photo by Andrei Gravelle.

[C] *Metamorphosis* by Jessica Dow and Mark Anderson is made of Argentium silver, Australian opal cabochons, and faceted pink spinel. Anderson cut the opals; Dow did the piercing, which she says is her favorite technique. "After years of handling a jeweler's saw on a daily basis I have found it has become an extension of my hand, somewhat like a pencil is to a sketching artist." 1½ x 1¼ in. (38 x 32 mm).

[D] Sterling silver, 14k gold, turquoise, lapis, coral, malachite, and opal make up Jeff Fulkerson's *Across the Universe* cuff. "I'm inspired by Jesse Monongye's work," Fulkerson says. "I love the night sky, and inlay is a way to re-create it.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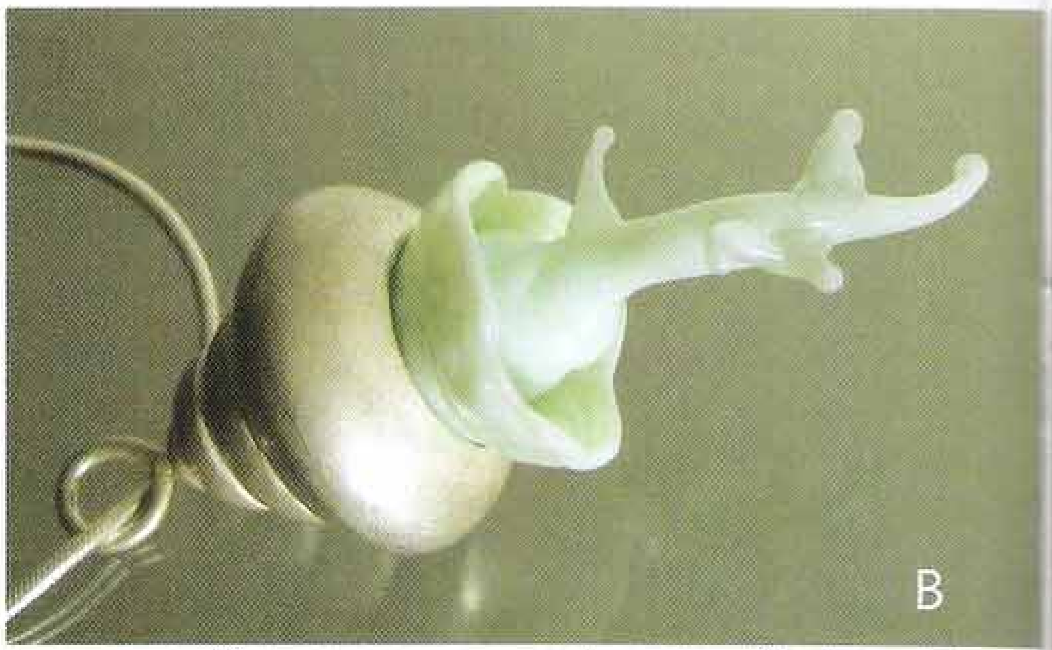
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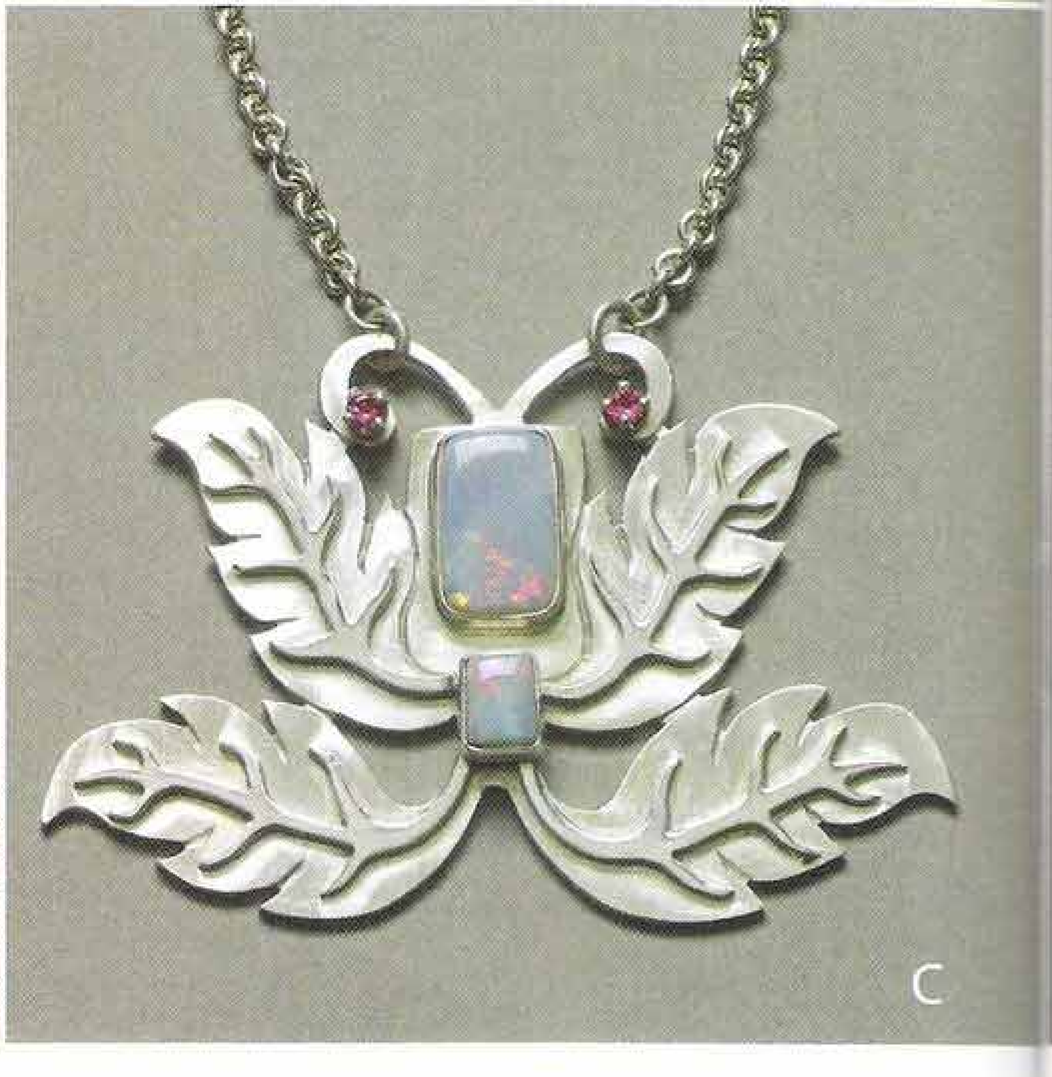
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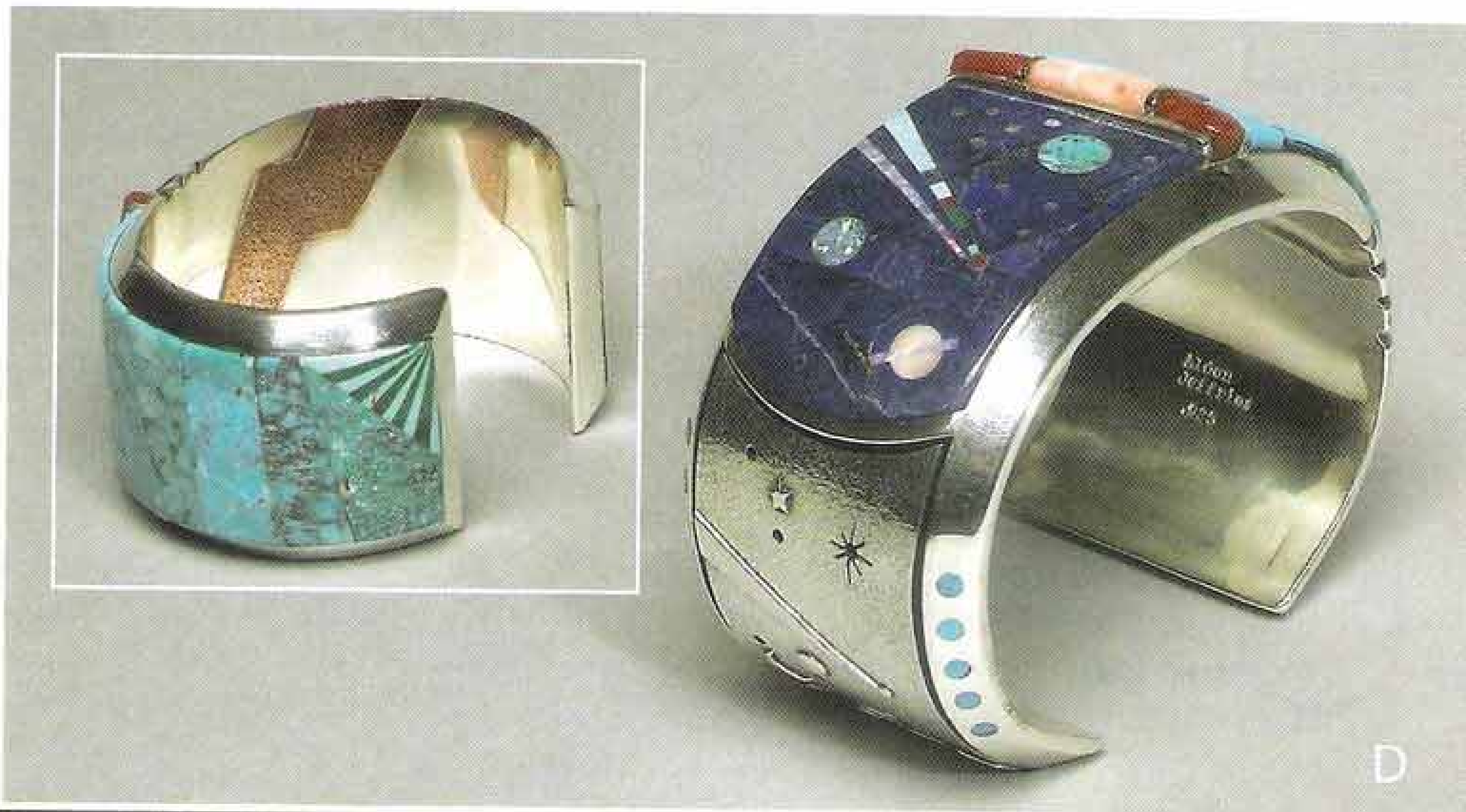
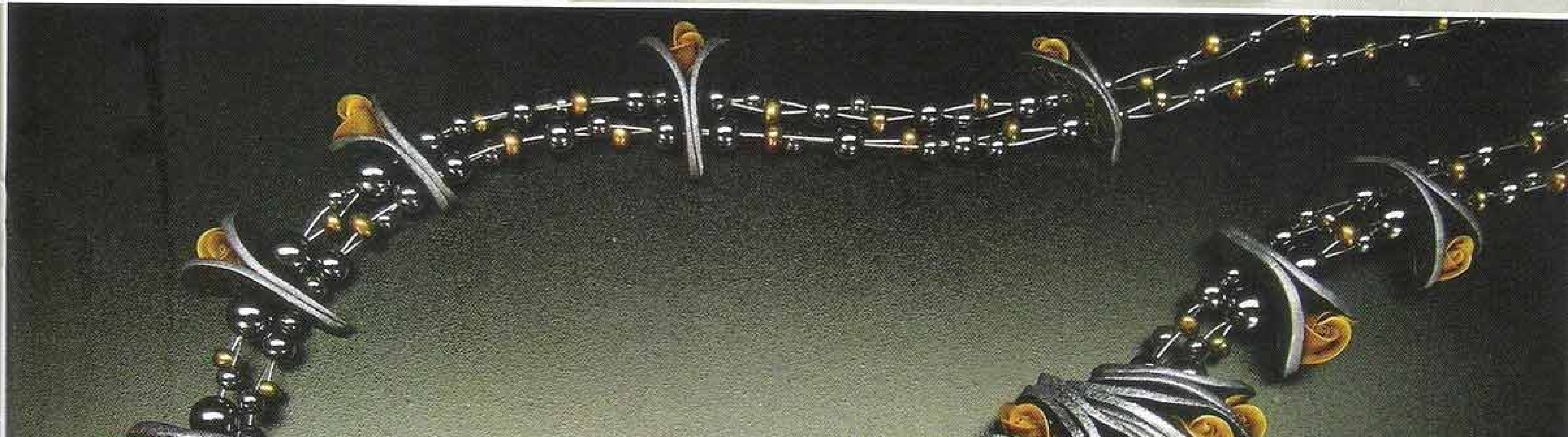
It's like painting with rocks!" 1⅜ x 2¼ x 2⅞ in. (35 x 57 x 73 mm).

[E] While experimenting with forms and shapes, Wiwat Kamolpornwijit created *Emerging Rose in Split Plate Necklace* from polymer clay, using hand-forming, caning, slicing, and layering techniques. He says, "The pliability … of polymer and [the] thin blade allowed me to [slice and split] a cane of polymer, creating this organic and open form." 20 in. (50.8 cm).





***To contact the featured artists, see Contacts,* page 93.**

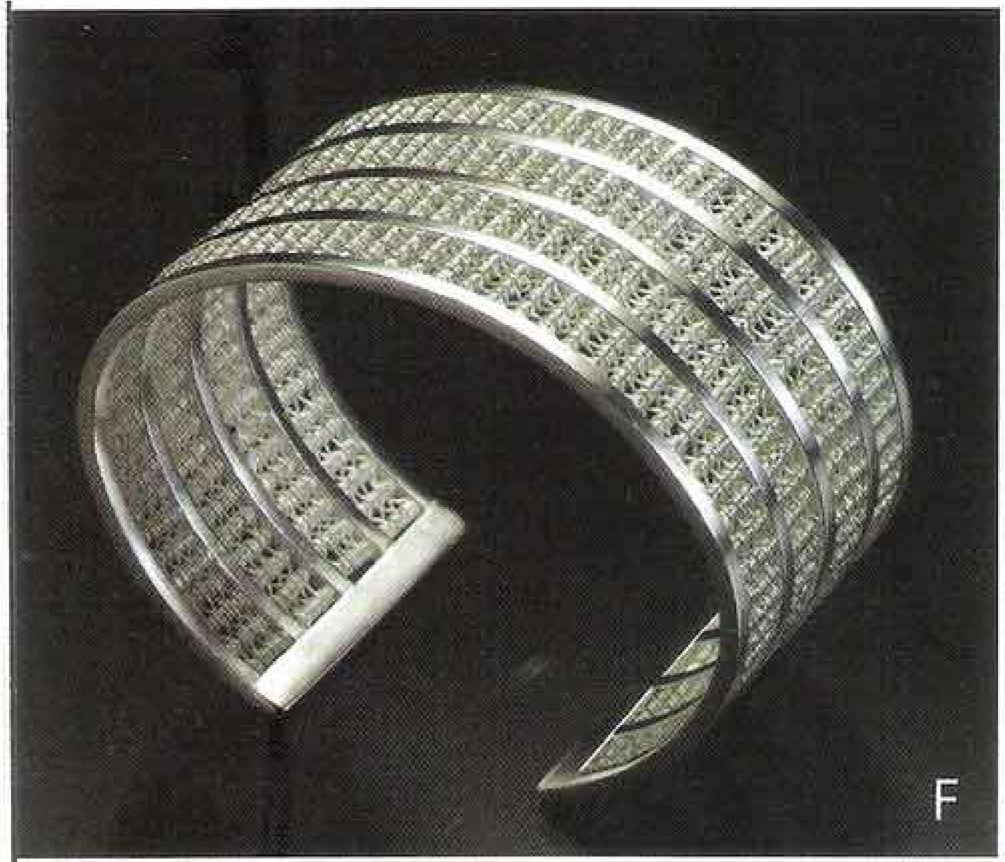
[F] Linda Bernasconi handwove fine silver through a fabricated sterling silver framework to make *Tiered Woven Cuff Bracelet*. She says, "Weaving metal perfectly marries my desire for beauty, cleanliness of design, control, and simplicity." 2 in. (51 mm). Photo by Guy Nicol.

[G] Black pantyhose are the backdrop for 22k gold leaf in Niki Ulehla's *Brooch*. Oxidized sterling silver and steel act as the frame. 50 x 10 mm (2 x ⅜ in.).

[H] Using transparency paper and custom pigments, Velina Glass cast her *Out of Africa* bangle with epoxy resin. She developed a technique that allows her to obtain color bleeding in transparent resin. 3½ x 2½ x ¾ in. (89 x 64 x 19 mm). Photo by Joseph Hyde. For a project from Glass, see "See the Other Side of Resin," *page 56*.

[I] Susan Chin's *Philomena Earrings* are made of ebony, 18k and 22k gold, and Australian boulder opals. She fabricated the piece; the ebony is carved, drilled, and embedded with gold wire. Chin says, "Developing new textures and forms with the ebony and other materials [has] been the drive behind recent work. It's energizing to step outside of your entrenched materials and techniques." Photo by Ralph Gabriner.

[J] "My work explores the vague line between the natural world and the artificial one," says Jennifer Gierka. "Plastic elements combine with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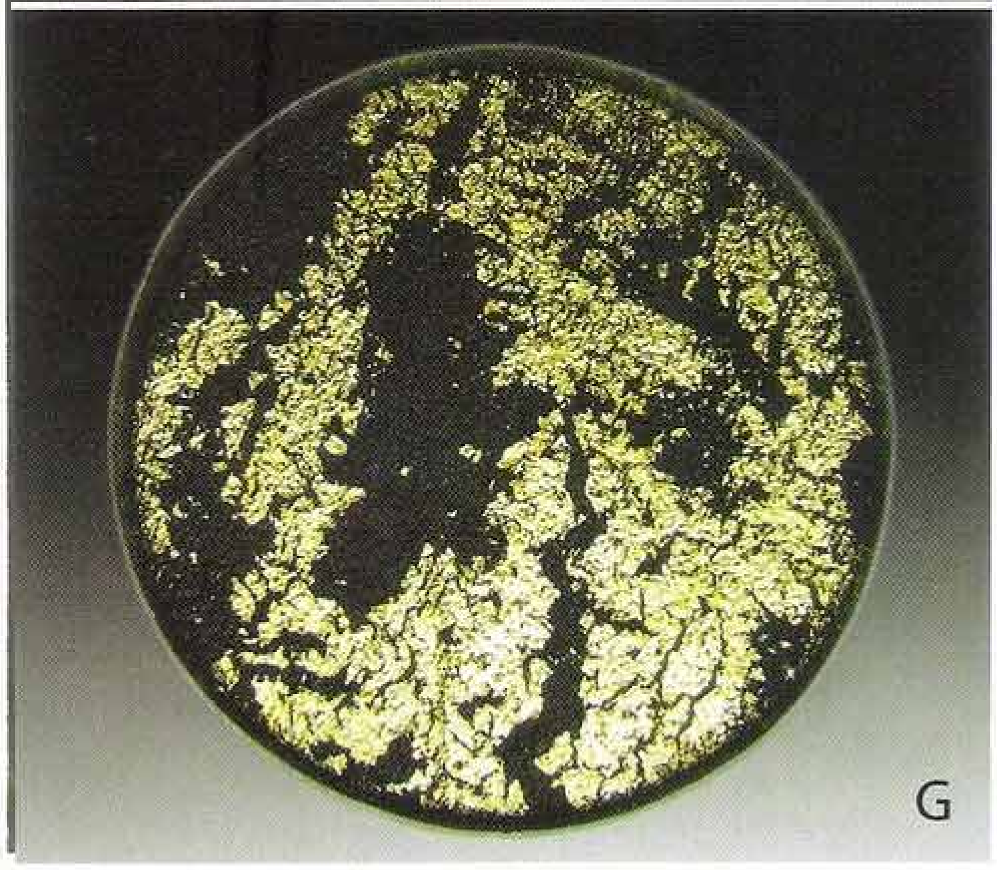
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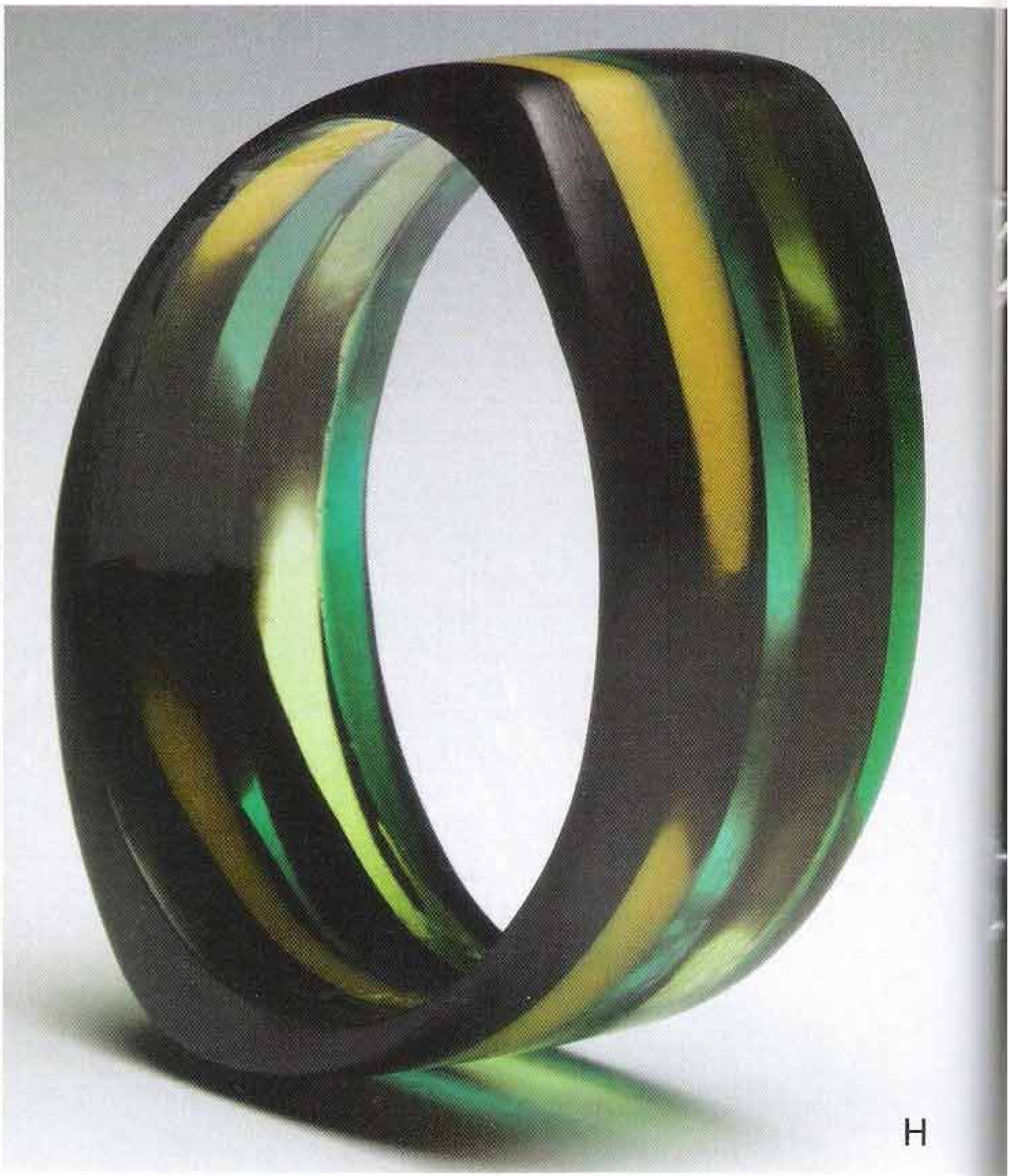
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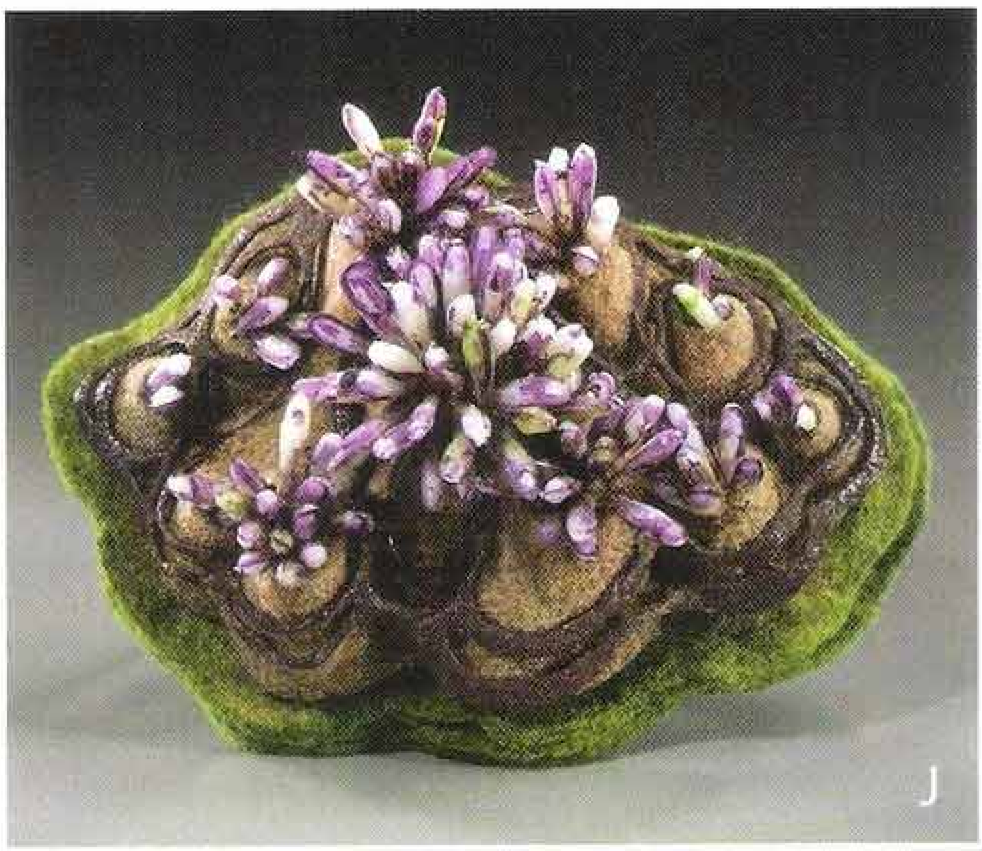
enamel and felt to create pieces that exhibit a strange ambiguous 'nature.'" Her brooch is made of copper, enamel, felt, and plastic. 4 x 3 x 2 in. (10.2 x 7.6 x 5.1 cm). Photo by Mark Johnston.
[K] *Mystere*, by Lucila Nassau, is based on the Boteh pattern, which Nassau says has an enigmatic and symbolic meaning that evokes immortality and timelessness. The necklace is made of sterling silver wire, citrine, peridot, tsavorite, and emerald cabochons.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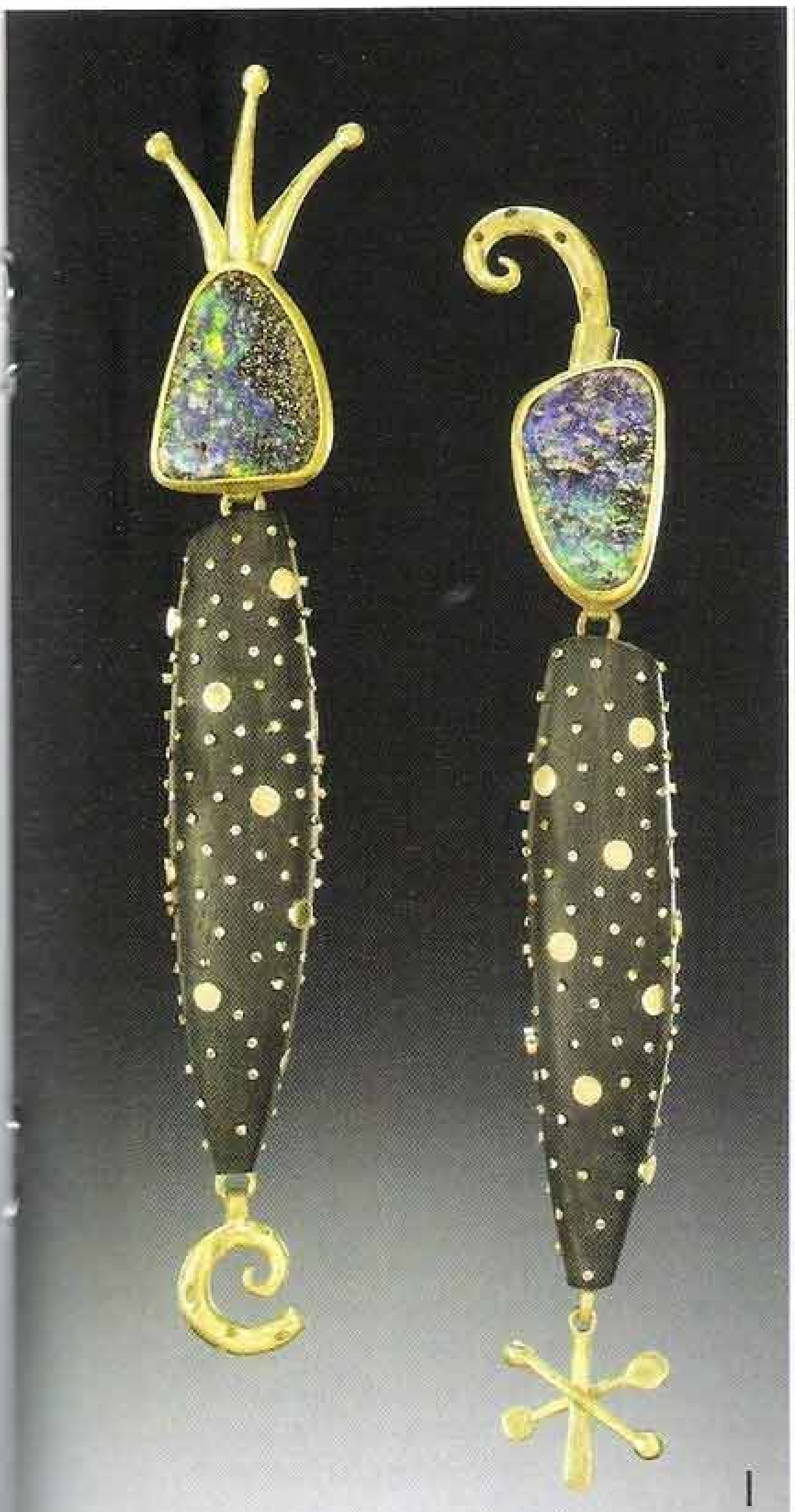
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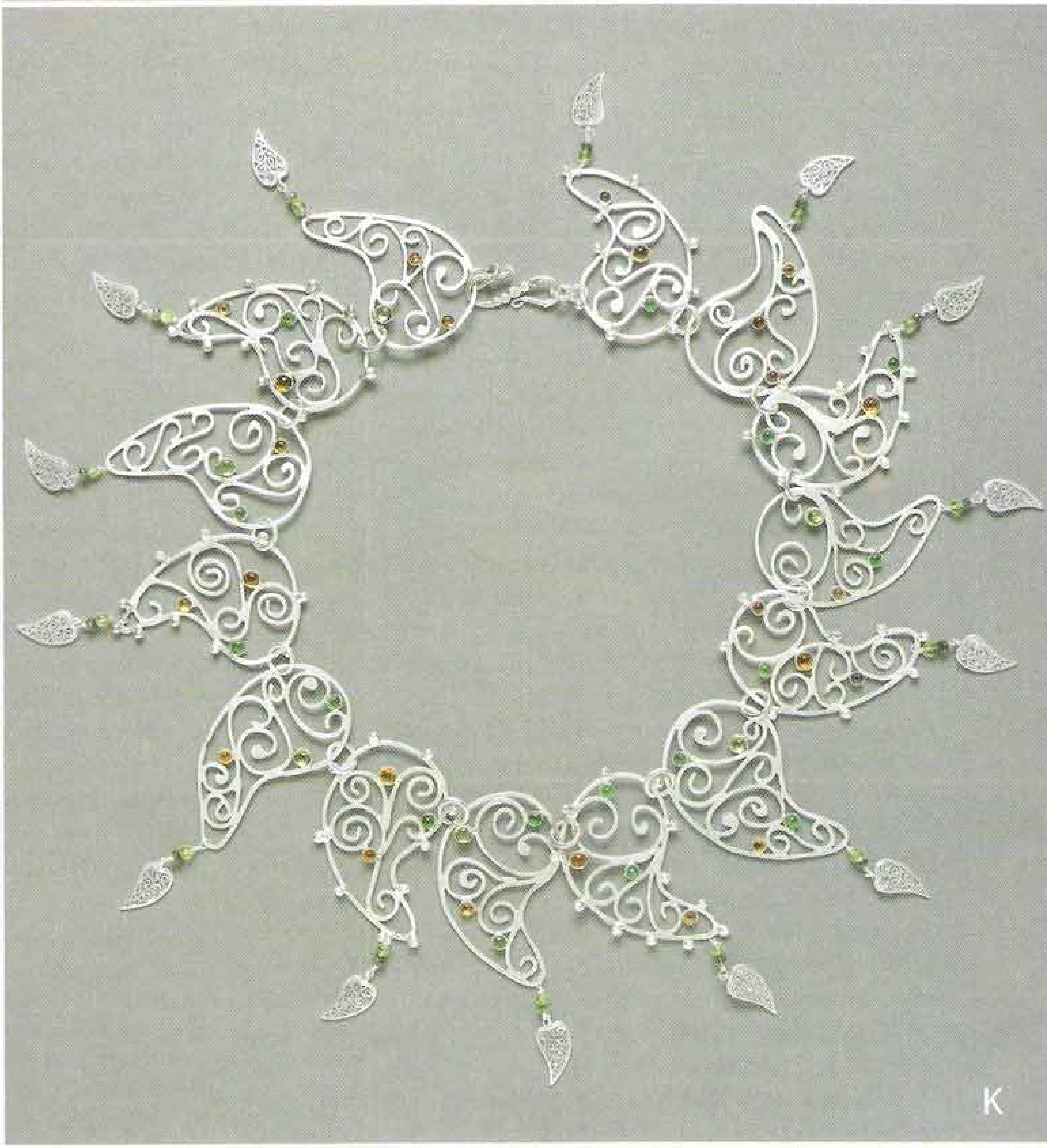
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***To contact the featured artists, see Contacts,* page 93.**

A conversation with Joan Tenenbaum

A linguist, an anthropologist, an award-winning jeweler, an artist, and a poet, Joan Tenenbaum fuses her technical, intellectual, and creative abilities into jewelry that is imbued with beauty, spirituality, and mystery. Her work consists of detailed, culture- and nature-inspired wearable pieces that she fabricates using precious metals and gemstones. We're pleased to share the celebration of our fifth anniversary with Tenenbaum, who is celebrating her fiftieth year of making jewelry. —*HLW*

You started making jewelry when you were 13. Did you consider studying jewelry in college, or was that not a serious option at the time?

I went to art school in the summer between high school and college. But my parents — though they were supportive of my jewelry, in that they bought my tools and materials and encouraged me, they treated my jewelry making as a hobby; they never considered it a career path. The only other artist in my family lived in New York and was referred to as "Crazy Esther." I didn't know I *could* get a degree in metalsmithing.

After finishing my bachelor's, I took 3 years off and studied silversmithing at the Craft Students League in New York, then went back to school and got my doctorate in anthropology and linguistics. When I was doing my research for my dissertation, I went straight from New York City to the wilderness of Alaska.

I imagine that was a huge culture shock.

Yes and no. The people were so hospitable and welcoming. I was struck by how vast everything was — the mountains and the rivers and the sky. The first month, I spent kayaking in Prince William Sound on a wilderness course. We were completely in the wild. There was no pipeline at that time, so Prince William Sound was just pristine. The first week, we beached our kayaks in this particular cove, and I climbed up the hill and looked at the view, and I had a profound sense of being home. I knew I was going to stay. Alaska grows on you. In fact, the piece I'm designing today is called *It Leaves an Impression on You*.

I expected Alaska to be huge. But it started to affect me in my self. When you're in a place that's that big, that open, and that expansive, your own personal being starts to expand. That's what started to happen to me.

What was your day-to-day life like there?

I had to find a language that had not been documented and a place where it was still a living language, and live there and document the language. I narrowed it down to one village, where there were about 75 speakers of the language, and I lived there for 2 years. I lived in a tar-paper shack, like the people did. There was no running water, the mail plane came about twice a week. At the end of 2 years, I went to Fairbanks, where there was a university and other linguist colleagues.

The 2 years I spent in the village were the only 2 years in my life that I didn't have my jewelry tools with me. When I arrived in Fairbanks, I had my tools sent to me, and I started making jewelry again, and oh, I missed it so much!

How did you make the jump to full-time jewelry making?

I knew in my heart that I wanted to make jewelry as my life, I just didn't know how to go about doing it. I told everyone that when I finished my dissertation I was going to make jewelry. But a colleague said, "Well, Joan, are you ready to go to Shishmaref? There's a job there for you if you want it." And I said, "I'm going to make jewelry; I don't want a *job*!" But I had no money, I didn't know how I was going to live. So I took the job, which was in a program to train Native students to be teachers.

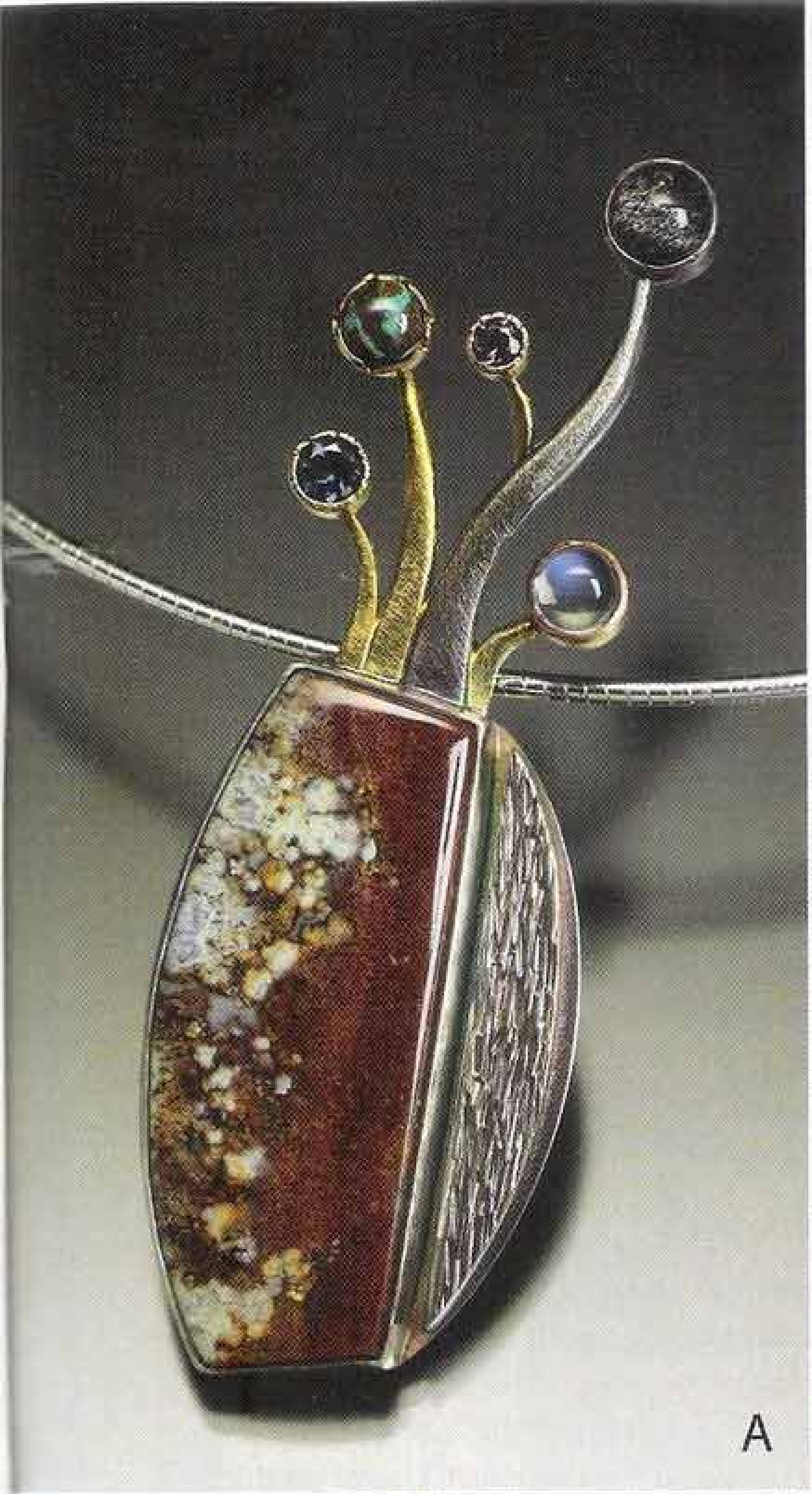
I resigned that job after a year. I went to visit a friend in a little Eskimo village in southwest Alaska. I fell in love with the place and the people. The language, Yup'ik, was alive and spoken all around me, even by the children. As a linguist, I was thrilled to hear it. I decided to stay there and have all my tools shipped to me and live there and make jewelry.

A few months into that, I got a letter from the community college in the region; they asked me to coordinate classes in two different villages. After 4 years doing that, I decided, "I have to make jewelry full time." That was the third time I was going to resign a job to make jewelry. And I knew if I didn't do it then, I wouldn't do it.

How does anthropology relate to jewelry making?

They relate within me. I want to tell those stories. I want to tell the world about the cultures and the practices and the beliefs of

[A] *Whose Woods These Are* pendant. Sterling silver, 24k gold, Sonora plume agate, dichroic glass, spinel, boulder opal, blue moonstone. 2⅞ in. (73 mm) high. [B] *Raven and Caribou: A Dena'ina Story* pendant. Sterling silver, 14k gold, garnets. 2⅜ (60 mm) high. [C] *Raven Steals the Light* necklace. Sterling silver, Mexican matrix opal, champagne diamond, opal and black onyx beads, silk. 3⅜ in. (86 mm) high. [D] *I Am My Landscape* brooch. Sterling and reticulation silver, copper, keum boo. 1¾ in. (44 mm) high. [E] *Glaciers Bead I*. Sterling silver, 14k gold, copper, mokume gane (copper/sterling), diamonds, citrine, sapphire. 1⅛ in. (29 mm) wide.
All photos by Doug Yaple.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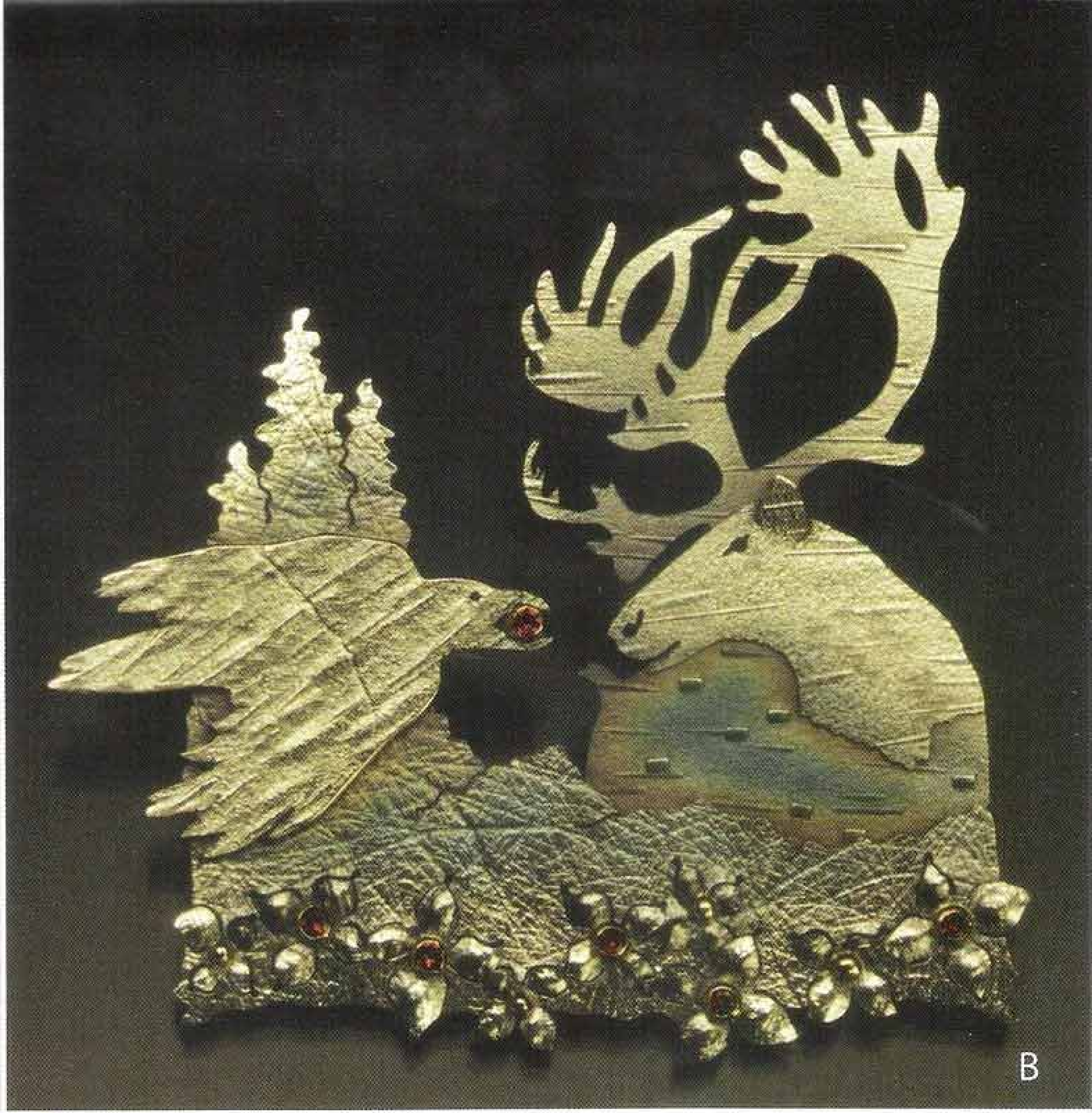
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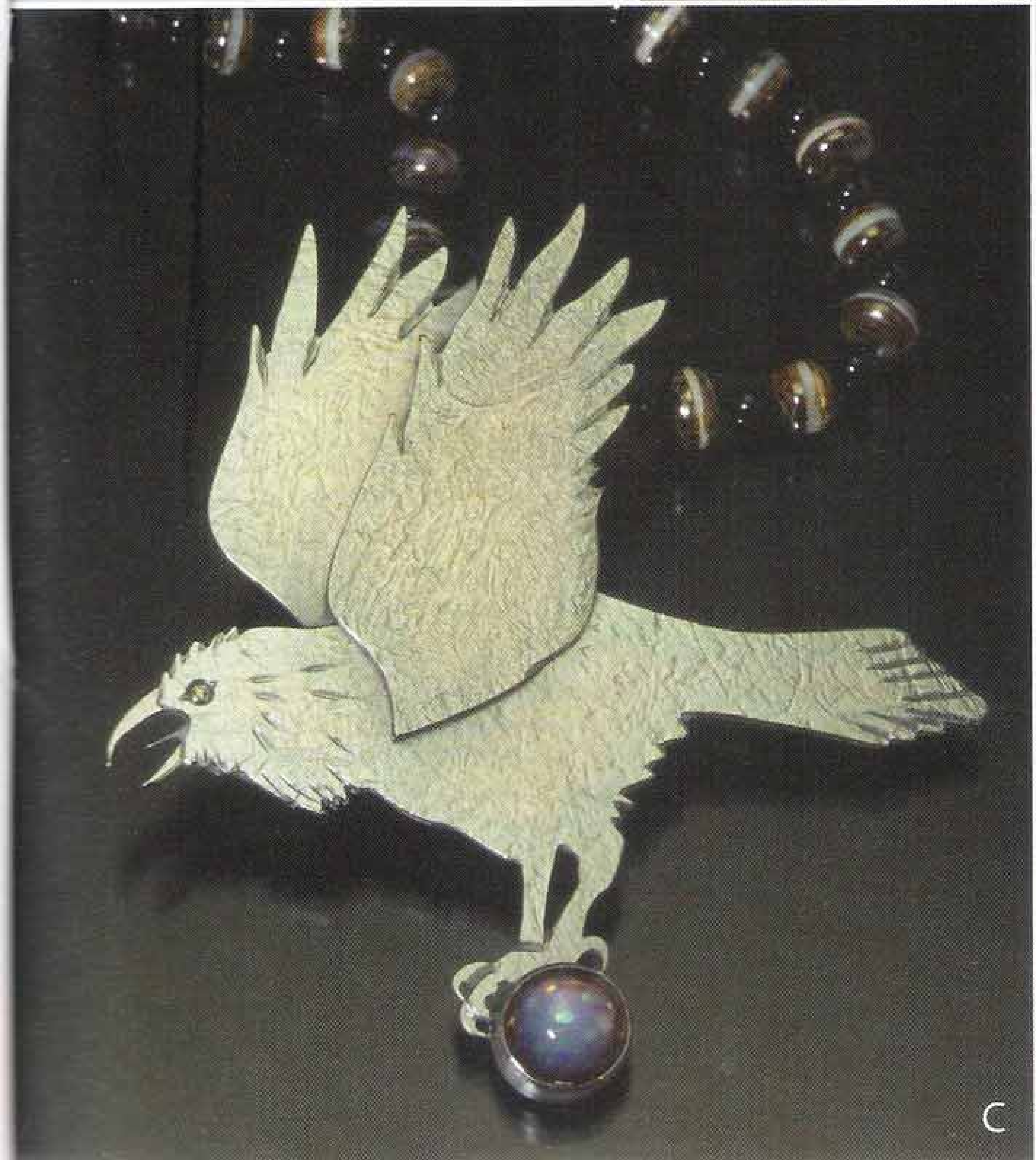
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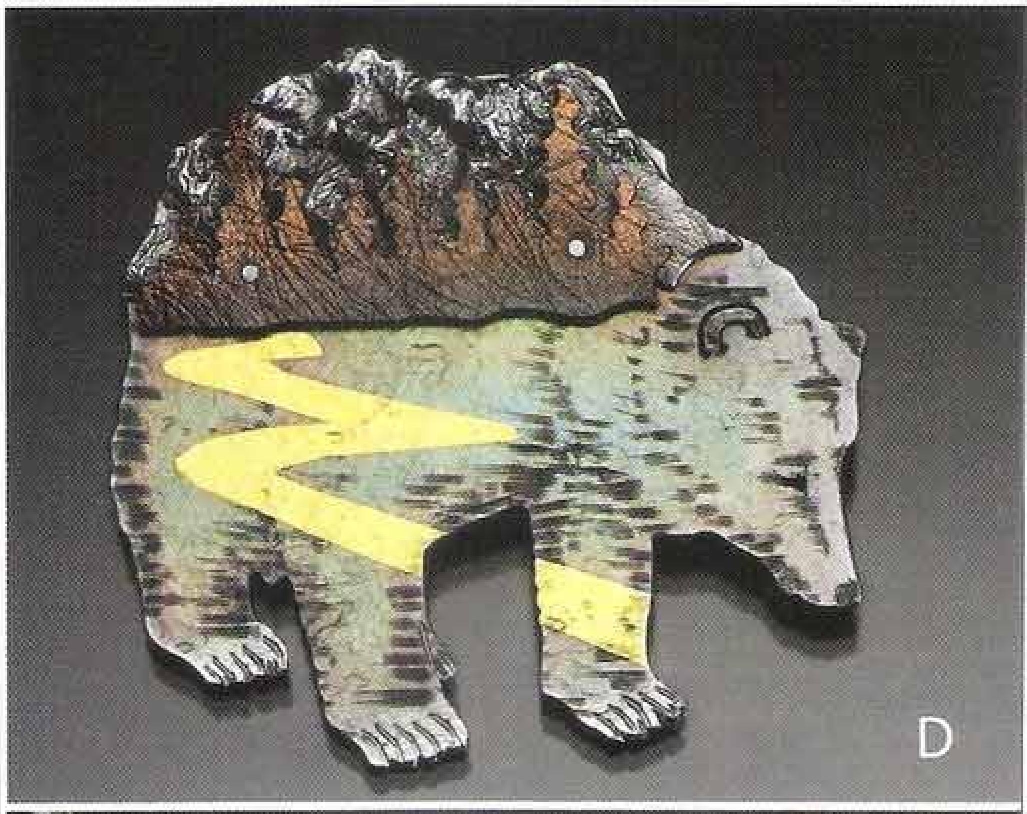
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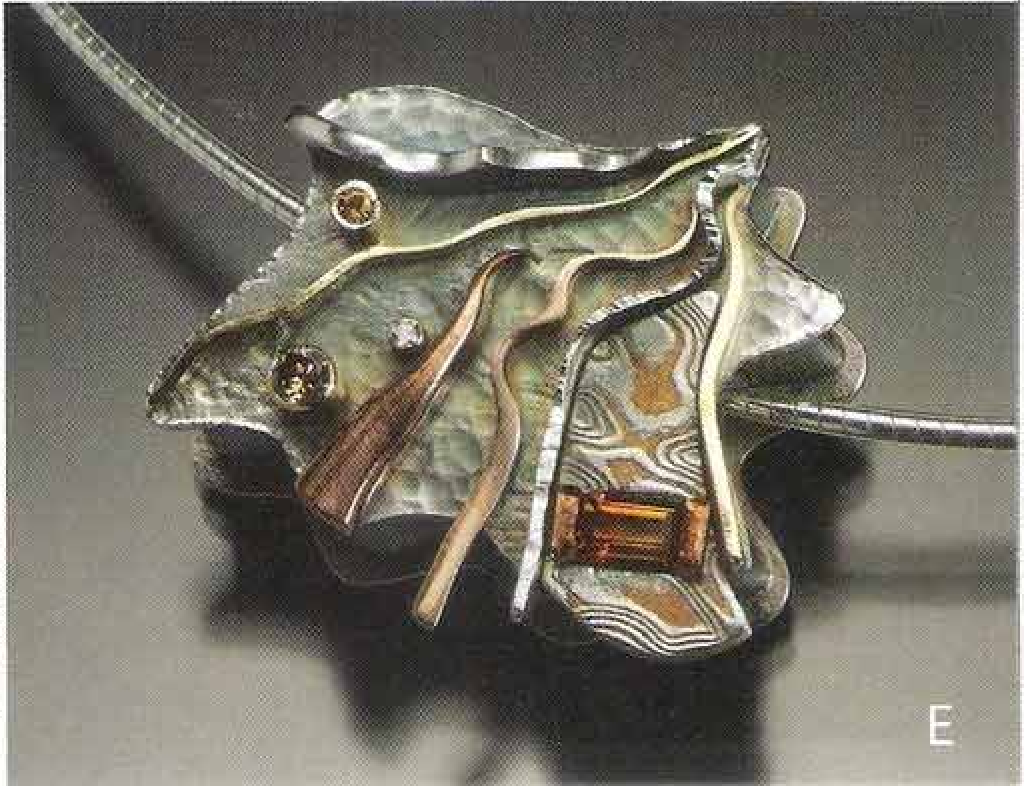
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those people. And that's the way I can tell it. Most anthropologists write scholarly articles and books. I'm doing the same sort of thing through my jewelry.

The center of anthropology is participant observation; you are a member of the community, and you're observing at the same time. I had an intense experience, especially in the last village where I lived. I've been going back there for over 30 years — it's the place that I had the most profound connection to and the people I had the deepest relationships with. It's like the jewelry — I keep going back because it's the thing I feel most deeply about.

What I tell in my jewelry are the stories of the Native people. My message is our connection to the earth. The people that I lived with, all three cultural groups I lived with, have never left their ancestral lands, they've never been moved from their ancestral lands. So the people there have a direct and intimate connection with their landscape.

There are visual references to stories of the people of Alaska in much of your work. How necessary is knowing those stories when viewing your work?

I see myself as a translator and a storyteller. The early masks were translations of original masks. The pieces I'm doing now, for the last 10 years or so, are my own creations. I sometimes use imagery from the cultures, but I'm telling my own stories based on my own experiences and the life of the people. The pieces stand on their own. I intend them to be beautiful first, and then tell a story.

Can you talk about some of the symbols you use, like the raven and the caribou?

The raven has extreme importance as a spiritual animal in the northern cultures. In Alaska, the raven is everywhere. And it always seemed to speak to me; it feels like *my* spiritual animal. For several of the cultures, the caribou keeps them alive. Food, clothes, tools, everything comes from the caribou.

Can you share one of the stories that inspire your pieces?

The Foggy Woman story is my favorite story that I recorded. A young man encounters a young woman out on the mountains when he's hunting. They fall in love. He wants to bring her home to his village, and she keeps saying no. Finally, she says yes. He brings her back to the camp. As soon as she arrives, the weather gets foggy and rainy, day after day. The people can't go out to hunt because of the fog, and they start to run out of food. They both realize it's because of her. They wrap up their baby in a blanket and walk up the mountain. They reach a point, and she says, "This is where you stay." As she goes up the mountain, the fog lifts with her. He bursts out crying. When he turns around, there are thousands of caribou in the valley, and he goes hunting, and provides food for his people.

It's an incredibly sad story, having to lose the one you love, but it's a very important value for the people, that the needs of the individual are secondary to the needs of the group. Having lived with those people, it's totally understandable that it would be a no-brainer. They would have to make sure their people survived.

Tell me about the ulu.

The ulu is the woman's knife. It's found throughout the arctic and subarctic. It is a woman's most useful tool. Whoever uses an ulu, it's like an extension of your hand. You can do amazing things with an ulu — I can't cook without mine! It's an iconic form; the image symbolizes to me and others the Eskimo woman. I decided to make jewelry in the shape and form of an ulu. Then I learned to make real functional ulus. Because of the way it's made, you get the full range of movement of your wrist. They use it for cutting fish, skinning animals, cutting skins, even cutting food as it's eaten — I've watched people cut off food *millimeters* from their lips. It's such a wonderful tool. And the shape of the blade, the handle — to me it just speaks jewelry.

You use such a huge range of jewelry-making techniques.

I've tried to master a wide variety of techniques. Basically the reason is that I can have a deeper vocabulary to express what I want to express. A piece of jewelry starts as a concept. Then I receive an image — I say "receive" because they come to me. I sketch it out and refine it into a design and then and only then I pick the materials I'm going to use. I decide on the technique I'm going to use and the gemstones I'm going to use. Knowing so many techniques allows me to get the density and the details I want in my work.

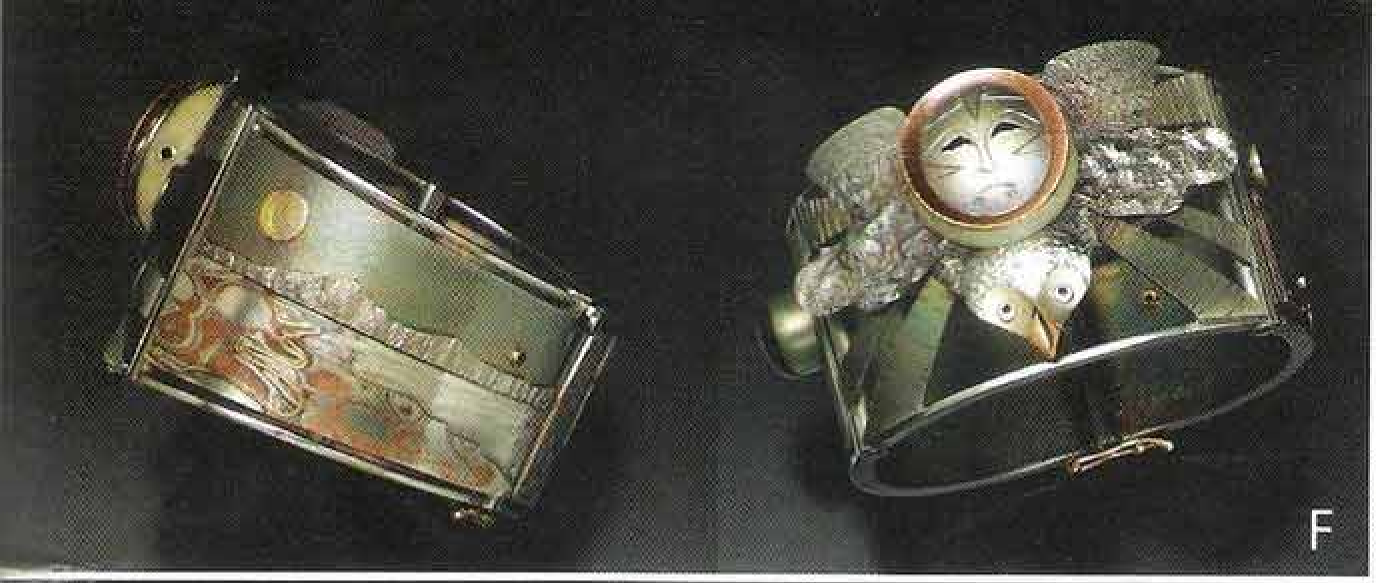
What about the stones that you use? Is it the same thing — that they're chosen to express an idea or fit the concept?

Yes. When I get a design worked out on paper, then I look through all my gemstones, look for one that's a size that I need. A lot of jewelry makers start with the stone first; I never do that. The design and texture and color of the stones have to say the right thing. I buy a lot of stones every year so that I can find a stone that works. And, I've learned a lot of different ways to set stones, so I can choose the way I'm going to set it for the piece.

After 50 years making jewelry, do you still have ambitions?

Oh, yes! I would love a piece of mine to be in a museum collection. I would love to see a piece on the cover of a magazine or a book. I want to continue to teach. I want to write a book about my life. And my jewelry — hopefully it'll be worn for generations. I have a detailed record of every piece I've ever made. Every piece I'm working on, I have a notebook beside me on the bench. I record times, materials, the process, the kind of solder I use ... that way, if I ever want to make a similar piece, or if a piece ever comes back for repair — which hardly ever happens — I'd be able to look it up. I want to continue making jewelry. I don't intend to ever stop until I can't see my work or I can't hold my tools. AJ

[F] *Owl Mask Spirit Helper Bracelet with Landscape Panels* (two views). Sterling silver, 14k and 18k gold, mokume gane (copper/sterling silver), copper, pyrite, ivory, burgundy sapphire. 1⅝ in. (41 mm) wide. [G] *Foggy Woman: A Dena'ina Story* brooch. Sterling silver, Damascene (steel, 14k gold), 14k gold, copper. 2½ in. (64 mm) high. [H] *Wolf Ulu Landscape Brooch*. Sterling silver, copper, dichroic glass. 2⅞ in. (73 mm) high. Inset: *Ulu Knife Small with Legs*. Steel, walnut wood. 6 in. (15.2 cm) wide. [I] *Bowhead Whale Ulu Landscape Brooch/Pendant*. Sterling silver, copper, 14k gold, fossil mammoth ivory. 1¾ in. (44 mm) high. [J] *Birch Forest Woman* pendant/sculpture. Sterling silver, 14k and 18k gold, copper, uvarovite garnet drusy, emeralds, apatite beads, cherry wood stand. 4 in. (10.2 cm) high. All photos by Doug Yaple.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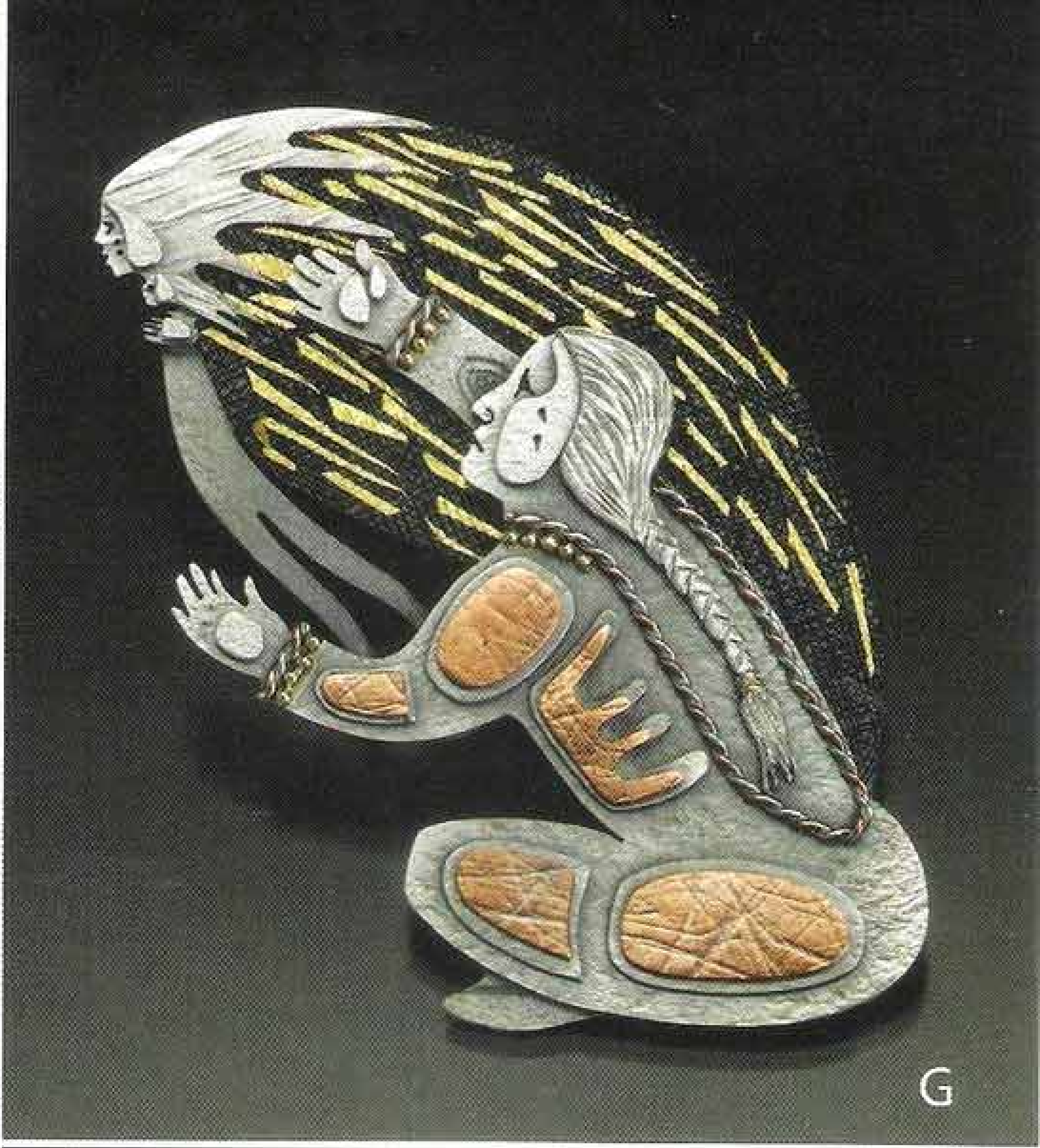
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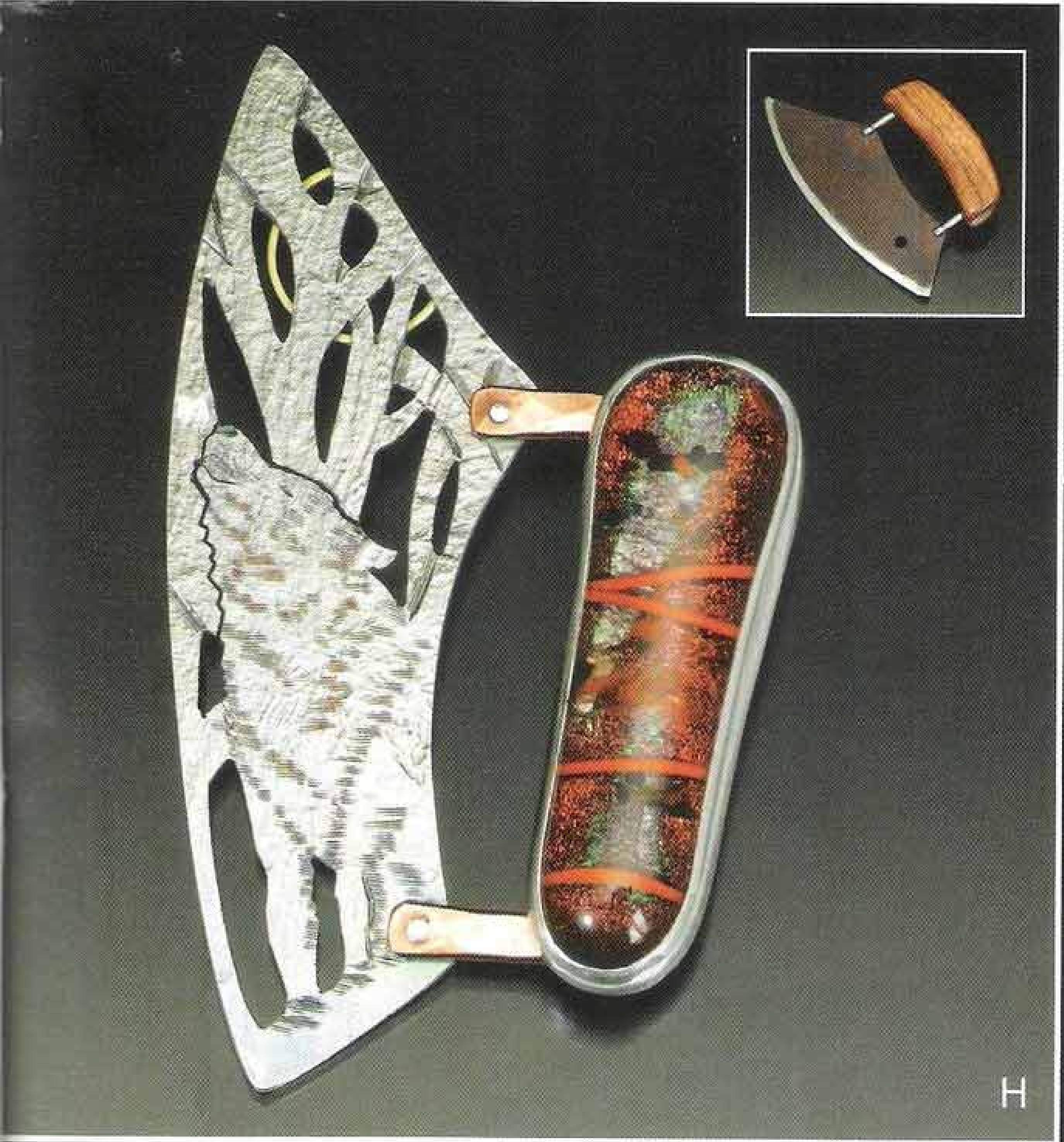
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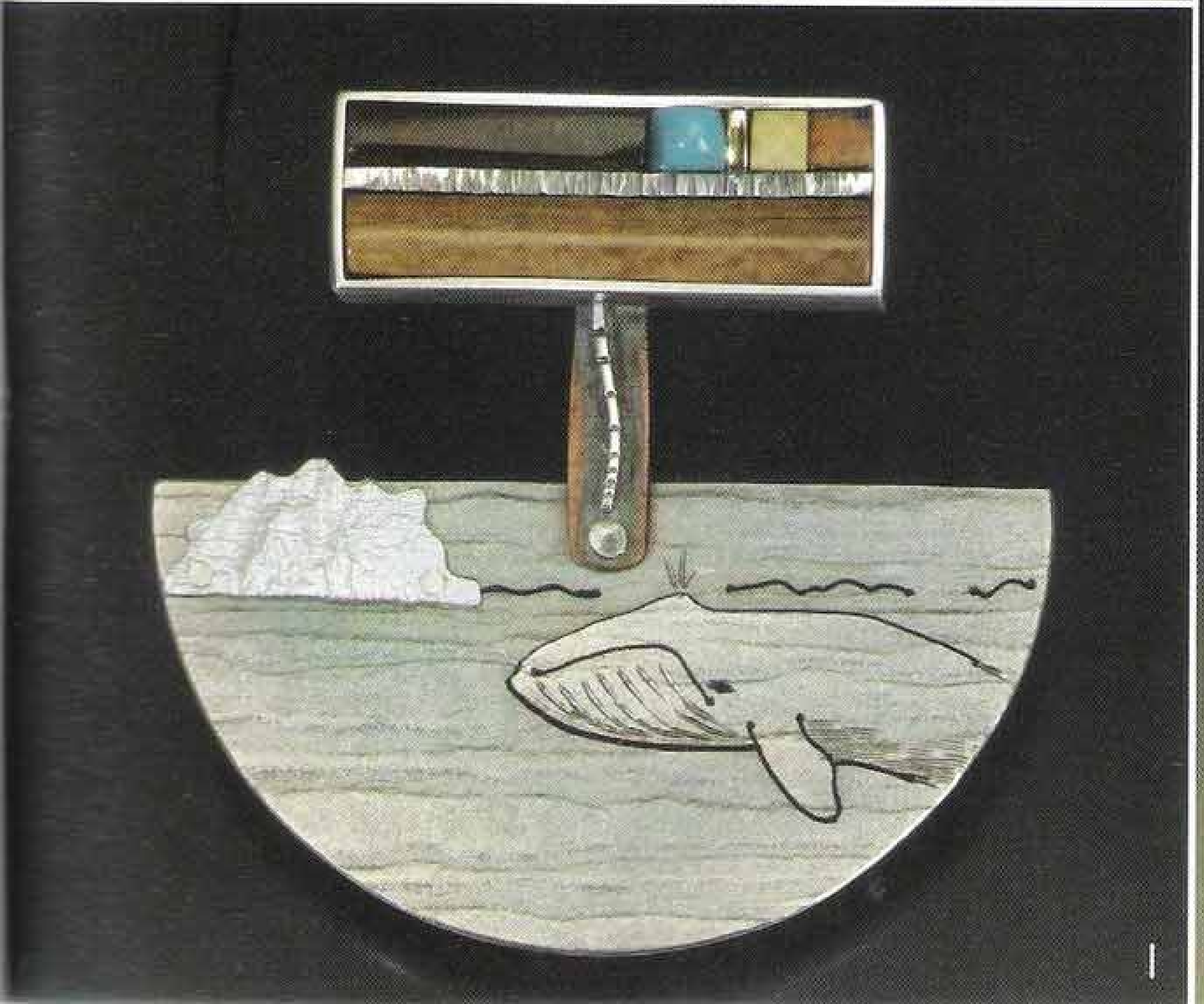
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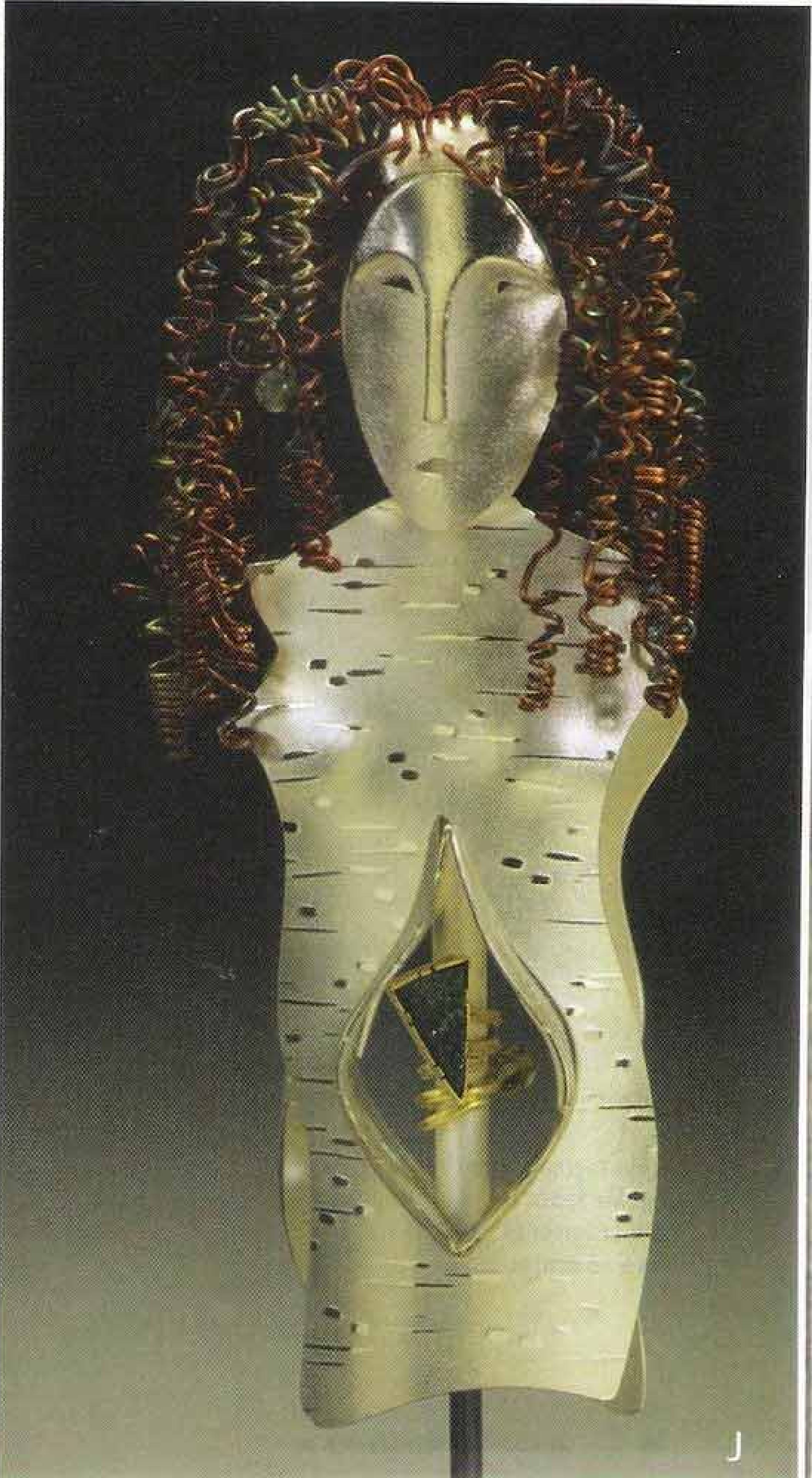
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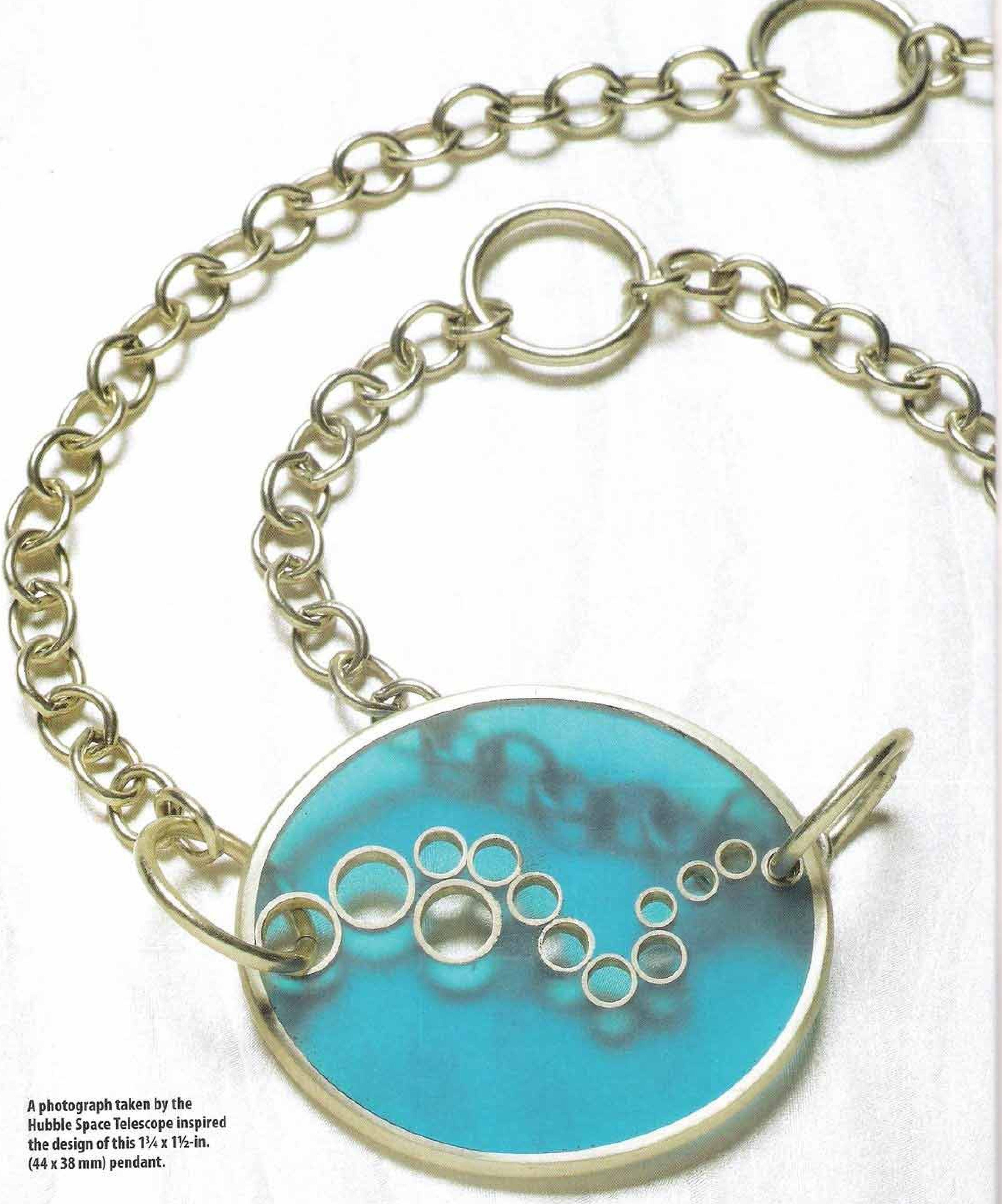


A photograph taken by the Hubble Space Telescope inspired the design of this 1¾ x 1½-in. (44 x 38 mm) pendant.

See the other side of resin

Two-part epoxy resin goes beyond its decorative role to become infrastructure.

by Velina A. Glass

My jewelry must have color as the focal point and a design that allows the wearer to become part of the piece. Resin is a medium that meets both of these requirements; you can easily enhance resin with pigment, and its transparency/translucence allows clothing or skin tone to impart another layer of color to the work.

The resin in this pendant does even more; it also holds the decorative circle pattern (tubing) in place. The tubes appear to float, whether you see the pendant from the front or back. You'll use basic metalworking skills to make the bezel and the circle pattern within it. I'll show you a trick that keeps the two-part epoxy resin from leaking out of the frame, plus I'll give you tips on how to give the cured resin a smooth, translucent finish.

EDITOR'S NOTE

Two-Part Epoxy Resins: An Overview

Safety first

Before you use any resin product, read the manufacturer's product instructions and the Material Safety Data Sheet (MSDS). If the MSDS was not included in the packaging, you should be able to download a copy from the manufacturer's Web site or at www.msdssearch.com.

Most epoxy resins are nontoxic, organic compounds that, once cured (hardened), do not irritate the skin. However, in the liquid state, both the resins and hardeners are skin and eye irritants. Follow these precautions when you're working with epoxy resins:

- Work in a well-ventilated area.
- Invest in a respirator with appropriate filters if you plan to do a lot of work in this medium.
- Wear safety glasses and latex or nitrile gloves.
- Wet-sand cured resin to minimize resin dust.
- Use disposal methods that are recommended by the manufacturer.

Key terms

Resin Part 1 of two-part epoxy formula

Hardener Part 2 of two-part epoxy formula; manufactured in thin or thick formulations

Mixing ratio The precise proportion of part 1 and part 2 as indicated by the manufacturer

Cure time The length of time required for the mixed formula to completely harden

Pot life The amount of time that elapses before the mixed formula begins to thicken

High viscosity A liquid state that resists flowing; thick liquids

Low viscosity A liquid state that flows easily; thin liquids

Epoxy resin adhesive A formulation typically used as a glue; examples include Epoxy 330 and Devcon 5 Minute Epoxy; available at hardware stores. Characteristics:

- quick cure time
- short pot life
- high viscosity
- noticeable chemical odor

Epoxy resin A coating or casting formulation; examples include Colores and EnviroTex Lite; available from jewelry suppliers and select craft stores. Characteristics (compared to epoxy resin adhesives):

- longer cure time
- longer pot life
- lower viscosity
- minimal odor

Working with epoxy resins

Epoxy resins come in two parts: resin and hardener. The two parts must be mixed in the precise ratio given in the manufacturer's instructions. Imprecise measuring and mixing prevents the epoxy resin from curing properly. For small batches, plastic medicine cups work well for measuring the resin and hardener. For larger quantities, it's helpful to use a digital scale.

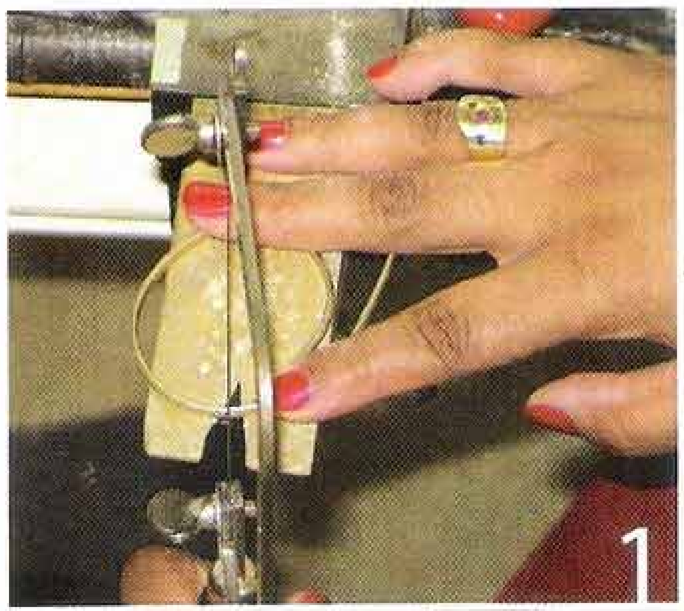
TIP: Adding colorants to resin can affect the resin-to-hardener ratio, so be sure to consult the manufacturer's guidelines before you add pigments.

Use a toothpick or wooden craft stick to thoroughly mix the resin and hardener. Stir gently to minimize the formation of air bubbles.

TIP: To pop air bubbles, pierce them with a pin. Or, exhale over the surface of the resin; carbon dioxide pops the air bubbles. Another option is to blow warm air over the resin, using a craft heat gun set on low. — *JLE*

COLORES Clear Epoxy Resin
8 oz.
COLORES Epoxy Hardener
8 oz.
RIO GRANDE

Epoxy resin adhesives, *above*, are available at hardware stores. You can get pourable epoxy resin formulations, *right*, from jewelry suppliers and select craft stores.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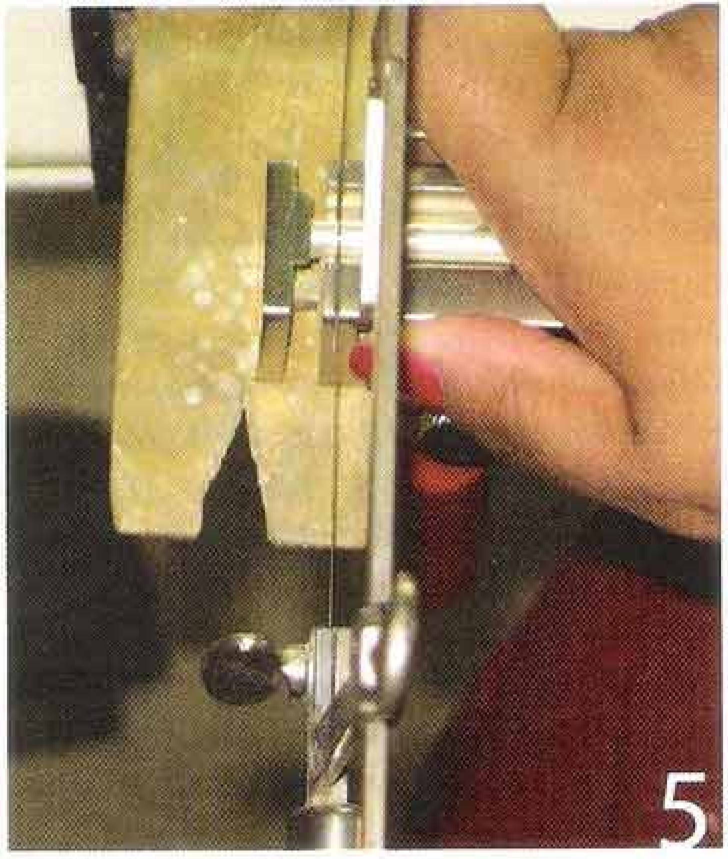
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Videos & Basics

Check out these bonus tutorials for fundamental techniques used in this project:

- Basic sawing 🎞 (See also "Sawing 101," *page 18*)
- Making a bezel B 🎞
- Opening and closing a jump ring B 🎞

B Basics, *page 87*
🎞 Videos, www.artjewelrymag.com/videos

Part 1: Bezel

Wire

Cut the bezel wire. Use a jeweler's saw with a 2/0 blade B 🎞 to cut a 4½-in. (11.4 cm) piece of 8-gauge (3.2 mm) half-round sterling silver wire **[1]**. Use a medium-cut hand file to file the ends flat. (I secure my wire in a miter-cutting jig vise when I file it **[2]**, but you could secure the wire in a ring clamp or bench vise instead.)

TIP: Jig vises are typically made of hardened steel, so don't use your best files with this tool.

Smooth the ends of the bezel wire with 320-grit sandpaper.

Prepare the bezel for soldering. Keeping the flat side of the bezel wire on the inside, bring the ends of the wire together. Push one end slightly past the other to create some tension. Then gently pull the wire ends until they snap tightly against each other.

Check the fit by holding the seam up against the light; you have a good fit if there is no visible light at the seam. File and sand the ends as necessary to achieve a good seam.

Solder and shape the bezel. Solder the bezel seam B 🎞, using hard solder **[3]**. Quench, pickle, rinse, and dry the bezel. With large half-round pliers, or a mandrel and a rawhide hammer, shape the bezel into an oval **[4]**.

NOTE: If you are using a tapered mandrel, flip the bezel as you hammer it to maintain a uniform oval shape.

Refine the bezel. Use sandpaper to remove excess solder from the interior of the bezel. Use a clean soft cloth to wipe the interior of the bezel.

Tubing

You'll use pieces of tubing to create the pattern of circles within the bezel. The tubing is also structural, because it strengthens the bezel wall.

Cut silver tubing. Select three pieces of tubing, each with a different diameter. Using a tube-cutting jig and a jeweler's saw with a 2/0 blade, cut the tubing into pieces about 1 mm longer than the height of the bezel wall **[5]**.

Apply lacquer to the bezel and tubing components. Lay the bezel and tubing components (stand them upright but not touching one another) on a piece of cardboard. In a well-ventilated area, spray them with a coat of clear lacquer.

NOTE: The lacquer helps prevent the metal from oxidizing. It's important to minimize the discoloration of the metal, because the resin will act like a magnifier, making imperfections more prominent.

Place a box or other container over the cardboard to prevent dust from settling on the bezel and tubing components. Allow the lacquer to dry completely according to the manufacturer's instructions.

materials

- Sterling silver wire: 8-gauge (3.2 mm), half-round, 4½ in. (11.4 cm)
- Sterling silver tubing: various diameters, approximately 4 in. (10.2 cm)
- 2 sterling silver jump rings: to fit tubing
- Two-part epoxy resin and hardener: low-viscosity formula
- Resin colorant: eye shadow, acrylic paint, mica powders, alcohol-based inks, gold foil, etc.
- Chain
- Clasp

toolboxes, *page* 88

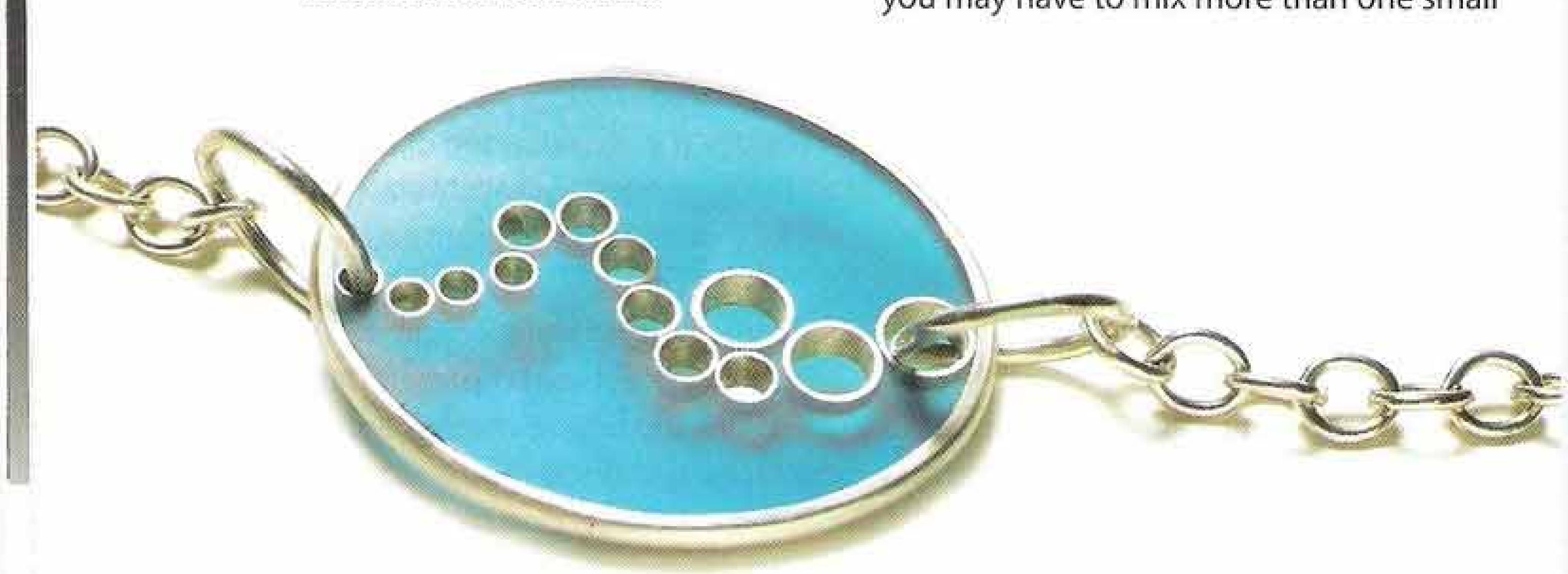
- Sawing/piercing
- Soldering
- Resin

additional tools & supplies

- Miter-cutting jig vise, ring clamp, or bench vise
- Bezel-forming tool (choose from):
  - Pliers: large half-round
  - Mandrel, rawhide mallet
- Tube-cutting jig
- Lacquer spray: clear
- Acetate sheet or overhead projector transparency sheet
- Two-part epoxy resin adhesive
- Paintbrushes: disposable
- Silly Putty
- Carpenter's level (optional)
- Pliers: chainnose

See Suppliers, *page 93*
See Safety Basics, *page 89*

▼ Select jump rings in a gauge and diameter that complement your captured pieces of metal tubing. Pendant shown actual size.



Lay out the tubing design. Place a sheet of acetate over a sheet of cardboard. Lay the bezel on the acetate. Using tweezers, stand the tubing components within the bezel wall in an attractive design that spans the diameter of the bezel.

NOTE: The tubing components must be close together and touch at least two points of the bezel wall. Consider the placement of those two points; you'll use jump rings at these points to connect the pendant to your chain, so their position will determine the way your pendant will hang.

Assembly

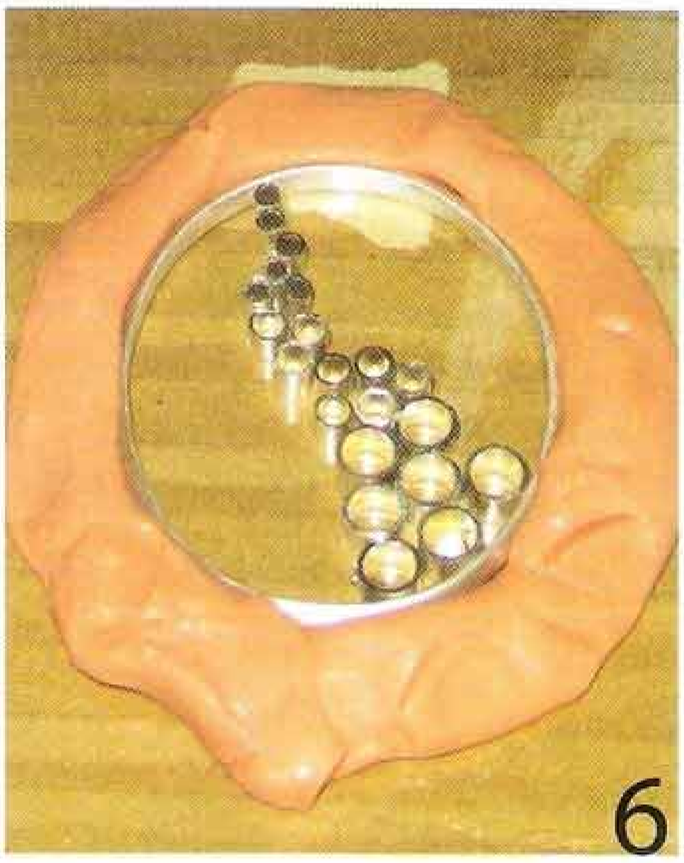
Mix epoxy resin adhesive. Wearing latex or nitrile gloves, follow the manufacturer's instructions to mix a small batch of epoxy resin adhesive. (See "Two-Part Epoxy Resins: An Overview," *page 58.*)

Glue the bezel to the acetate. Leaving the tubing in place, carefully lift the bezel wall. Use a disposable paintbrush to apply the epoxy resin adhesive to the bottom of the bezel. Avoid getting adhesive on the interior of the bezel wall. Use a clean disposable paintbrush to remove any excess adhesive.

Place the bezel adhesive-side down in its original position on the acetate. Allow the adhesive to dry completely.

Glue the tubing components to the acetate. Use tweezers to carefully lift one piece of tubing from your design. Apply adhesive to the bottom edge of the tubing, and return the tubing to its original position, gluing it to the acetate. Repeat to glue the remaining tubing components to the acetate.

NOTE: Because the adhesive cures quickly, you may have to mix more than one small batch, gluing only a few pieces of tubing at a time.



6

Allow the adhesive to dry completely.

Secure the bezel. Press Silly Putty around the outside of the bezel **[6]**.

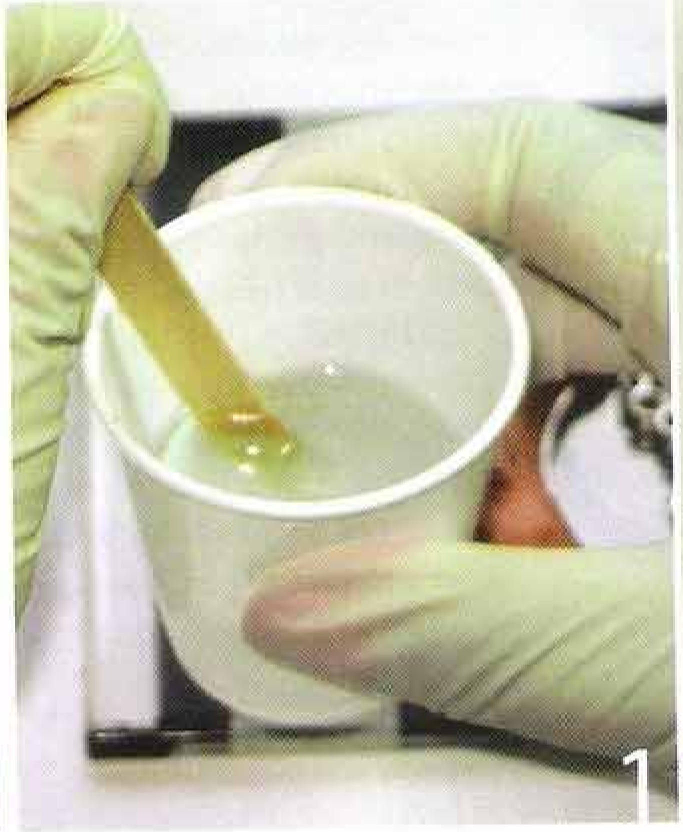
NOTE: Surrounding an open-back bezel with Silly Putty prevents the resin from leaking outside the bezel wall.

Be sure the bezel assembly is on a level surface. If you don't have a carpenter's level, use a glass of water as a gauge to determine if your table or work surface is level.

more plastic projects

You might also like "3 Ways to Use 2-Part Epoxy Resin" (January 2007). If you don't have the issue, you can buy a downloadable PDF of the reference article at www.artjewelrymag.com/projects.

3 ways to use 2 part epoxy resin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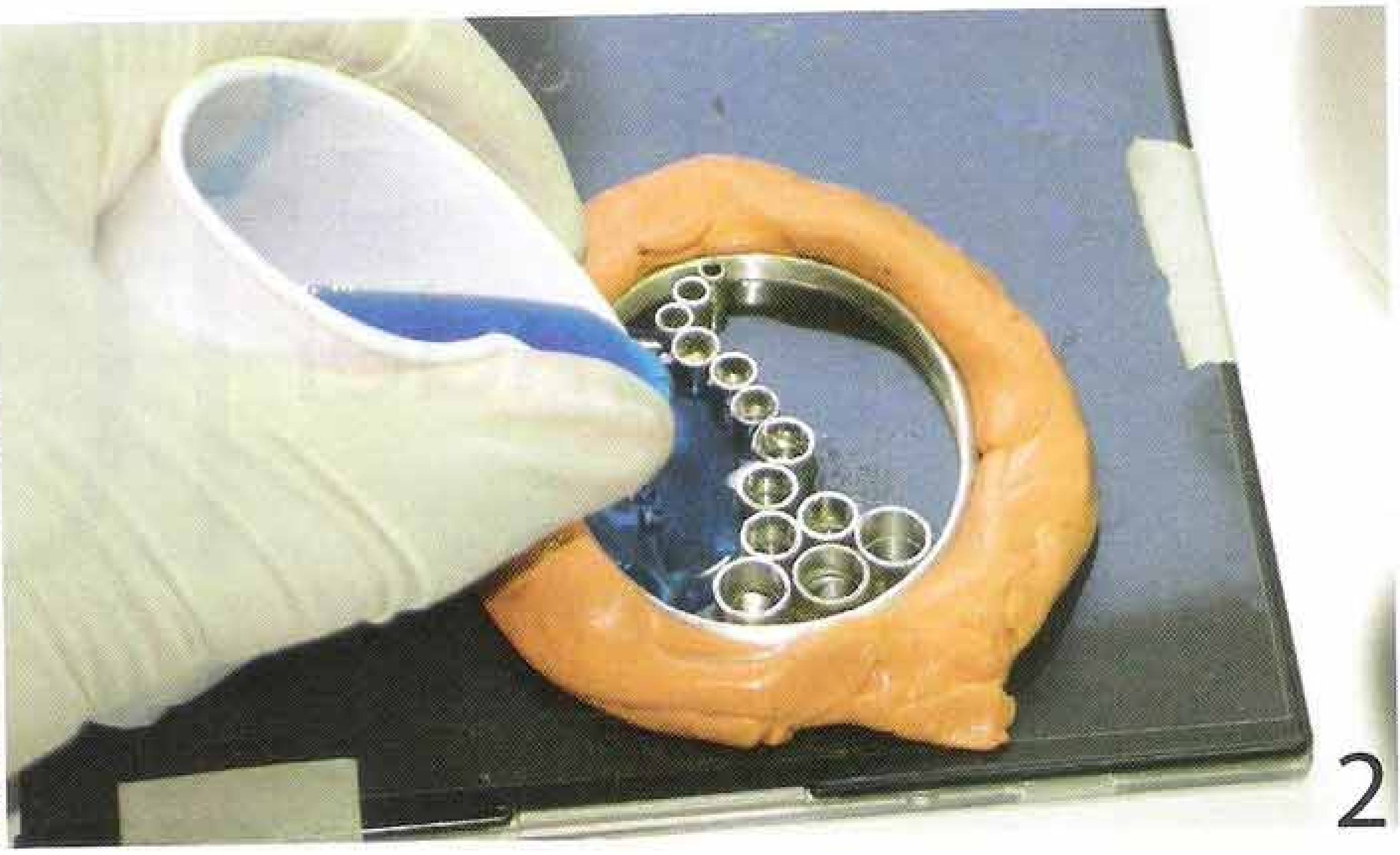
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Process photos by Christopher Glass.

Part 2: Resin

Mix the epoxy resin. Wearing latex or nitrile gloves and following the resin manufacturer's instructions, add the proper proportion of hardener to resin, being sure to account for any modifications in mixing ratios that the manufacturer lists for adding colorants.

Use a wooden craft stick in a figure-8 motion to slowly mix the resin and hardener **[1]**.

Add a colorant. I used a colorant that I purchased from the resin manufacturer. For other pigment options, see "Add Color to Resin," *right*.

Use a toothpick to add just a dot of color and mix thoroughly.

TIP: A tiny amount of pigment goes a long way. Add pigment sparingly, just a little at a time, until you achieve your desired translucent or opaque color.

Pour the resin into the bezel. Avoid pouring resin in the openings of the tube components. Hold the pouring cup stationary while you pour resin in one area of the bezel **[2]**; this minimizes the creation of air bubbles. Pour until the resin domes slightly and is even with the top edge of the bezel wire. Repeat to fill the other open area of the bezel.

Remove air bubbles. Use a pin to pierce any air bubbles that formed from pouring the resin.

Cover and cure the resin. Place a box over the assembly, and allow the resin to air-cure according to the manufacturer's instructions.

TIP: When pouring resin, leave a layer of resin in the pouring cup. You can then use this leftover resin to check if the resin is completely cured, instead of making test pokes into your jewelry piece.

add color to resin

I've had success with the following additives:

- Eye shadow
- Acrylic paint
- Mica powders
- Alcohol-based inks
- Gold foil

TIP: When experimenting with color additives, combine them with epoxy adhesives, which cure more quickly and are less expensive than epoxy resin formulations for casting and coating.

Part 3: Finishing

Remove the pendant from the acetate. Peel the acetate sheet from the pendant. Don't worry if there are some surface imperfections; you'll be sanding these off later.

Remove excess resin from inside the tube components. You can use a drill to remove any resin that has leaked into the tube components. Select a drill bit that's slightly smaller than the inside diameter of the tubing, and insert it in your flex shaft. Drill out the excess resin, taking care not to gouge or thin the interior walls of the tube.

Wet-sand the pendant. Wet the pendant, and lay it flat on a sheet of 400-grit wet-dry sandpaper secured to a sturdy, flat surface. Using a figure-8 motion, sand one side of the pendant. Re-wet the pendant, turn it over, and then repeat to sand the other side.

Working through progressively finer grits of wet-dry sandpaper, sand both sides of the pendant until you achieve your desired finish. I sand my pieces by hand to a 4000-grit finish, because I like the surface of my pieces to be very smooth.

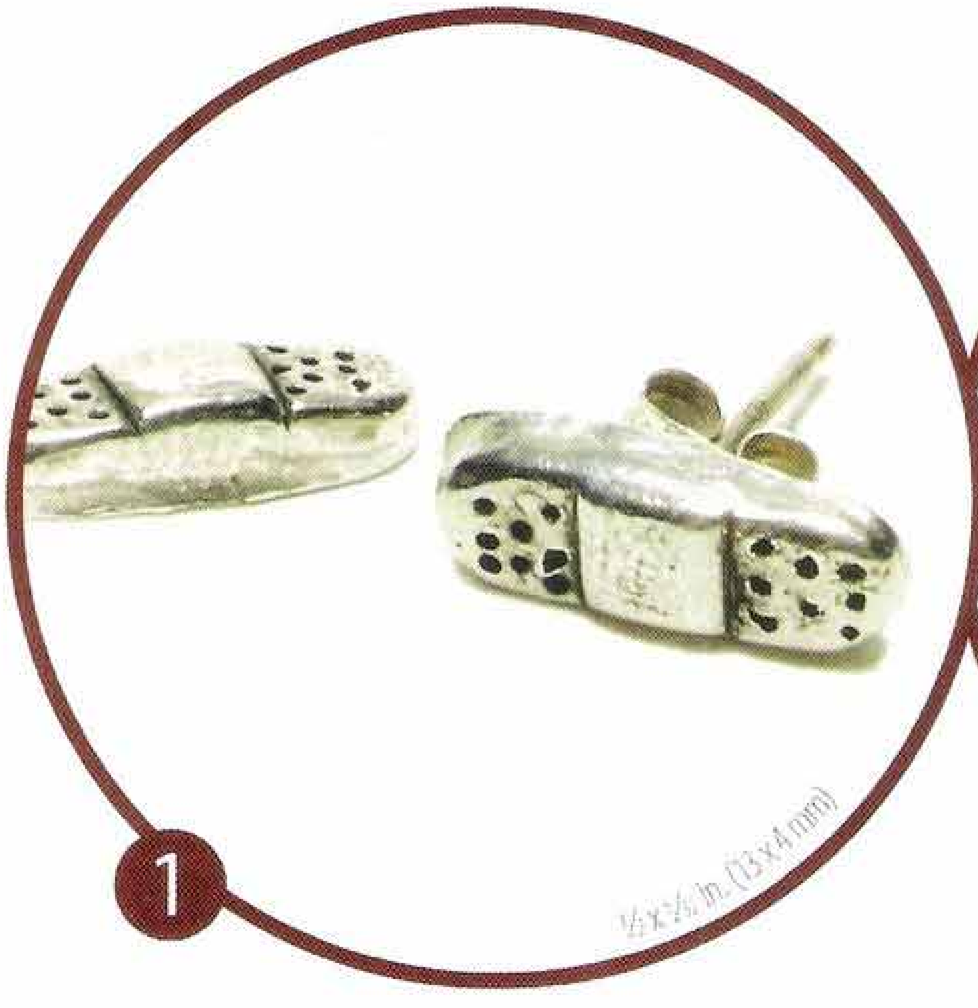
Add jump rings and chain. Use chain-nose pliers to attach a jump ring B to the tube component closest to the bezel on each side of the pendant. Attach your desired length of chain to each of these jump rings. Add a clasp.

5 under 10

Five jewelry makers show what's possible with 10 grams (or less) of metal clay.

Ever challenged yourself to create a piece of jewelry using just one 10 gram package of metal clay? We did — well, we challenged metal clay artisans to do it, that is. What started as the *Art Jewelry* editors admiring Natasha Bouey's tiny Band-aid earrings led to us issuing a challenge to the artisans on Etsy (www.etsy.com): Who could invent the most creative pieces of jewelry using just 10 grams of metal clay? (An "Alchemy bid" enabled us to tell Etsy members what we wanted; then individual designers pitched their ideas to us.)

Why bother? Well, we love to see innovative work. Plus, who doesn't want tips on how to economize? The more material you conserve, the more pieces you can make! Also, it's the magazine's 5-year anniversary, so we thought five inspiring metal clay pieces would commemorate the occasion nicely. Enjoy!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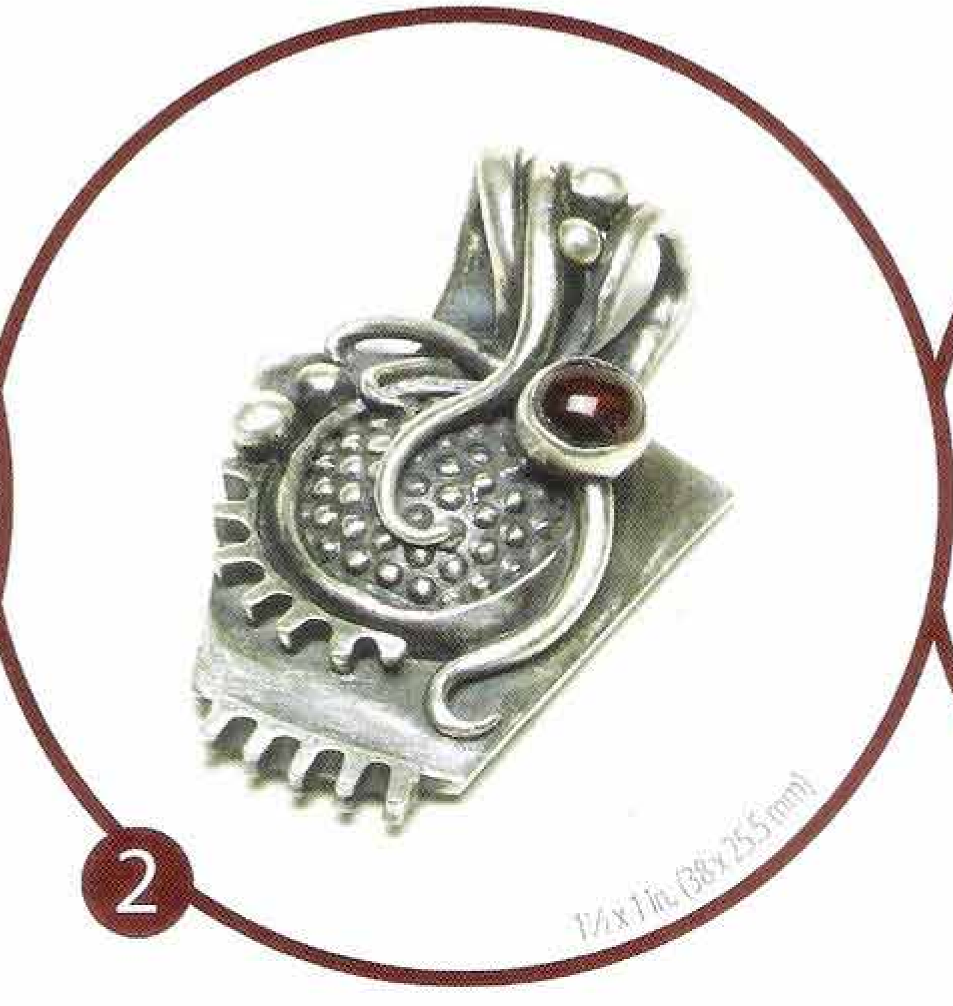
½ x ⅙ in. (13 x 4 mm)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1½ x 1 in. (38 x 25.5 mm)

3

1 **Natasha Bouey** says these earrings were a witty response to a friend's dress-code problem at work: The friend's manager insisted that her "too many" ear piercings needed to be covered with Band-aids. Bouey made Band-aid studs so her friend's new piercings wouldn't close up. Even the manager was impressed with the clever idea and allowed Bouey's friend to keep the piercings uncovered.

2 **Liz Hall** rose to our Etsy

train a dog, *Anyone can kayak*, etc. She says, "For these earrings, the figures look so pleased to be presenting their little flowers, so it seemed like the opposite of the song 'You Don't Bring Me Flowers,' and thus I named them *Anyone can bring me flowers*, as flowers are always happily received!"

4 **Lis-el Crowley**'s answer to our challenge focuses on texture. Crowley says, "I love working with texture, shape, and coils. For this piece I used some wonderful

tips for making the most out of your 10 grams of metal clay

Our featured artisans share their tricks for getting the most bang for your metal clay buck.

1. Make a prototype. Natasha Bouey and Alina Gridley both use polymer clay to mock up pieces before they commit them to metal clay. That way, they avoid using more metal clay than they need.

2. Finalize your craftsmanship in the wet stage. hape and size of compo- stage — less sanding mber to keep clay moist!

ects. Hall uses scraps to (like decorative balls), s later in other pieces. Also, 't work out, Hall will use it future piece.

ap. Hall sends unsalvage- supplier as scrap in buy more clay.

;. Ruth Baillie challenged she could hand sculpt a ıg it recognizable. By skills, she scaled down romising its strength.

ıgth, not bulk. Lis-el three thin layers to e that's not too heavy.

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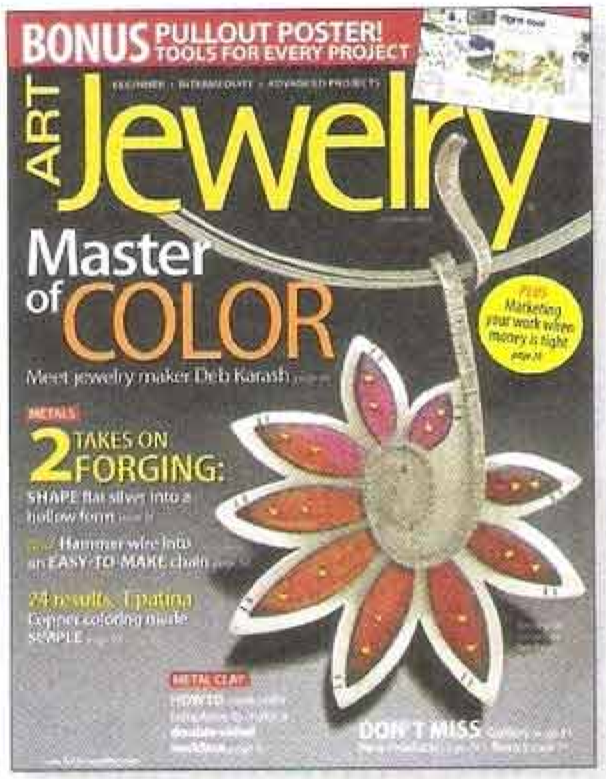
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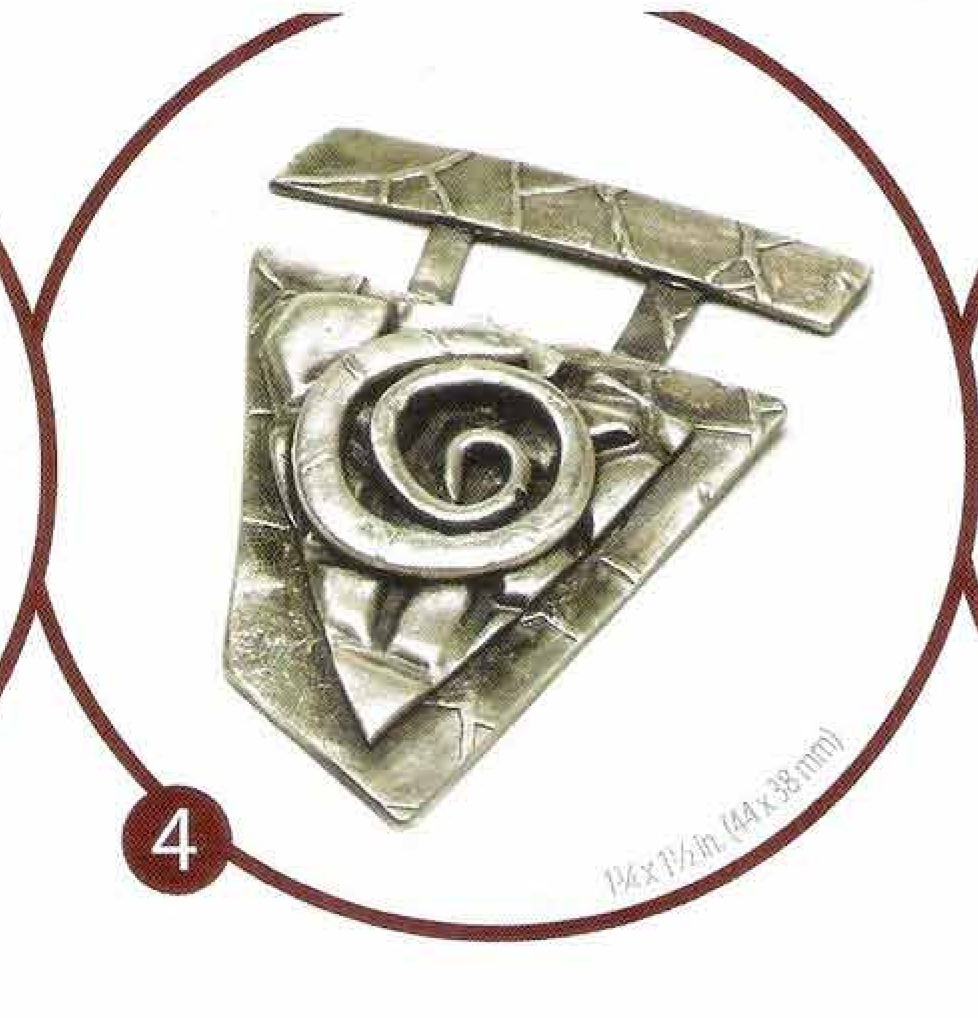
SHAPE flat silver into a hollow form
Hammer wire into an EASY-TO-MAKE chain
24 results, 1 patina
DON'T MISS

U119BZ1

in. (16 x 6.5 mm)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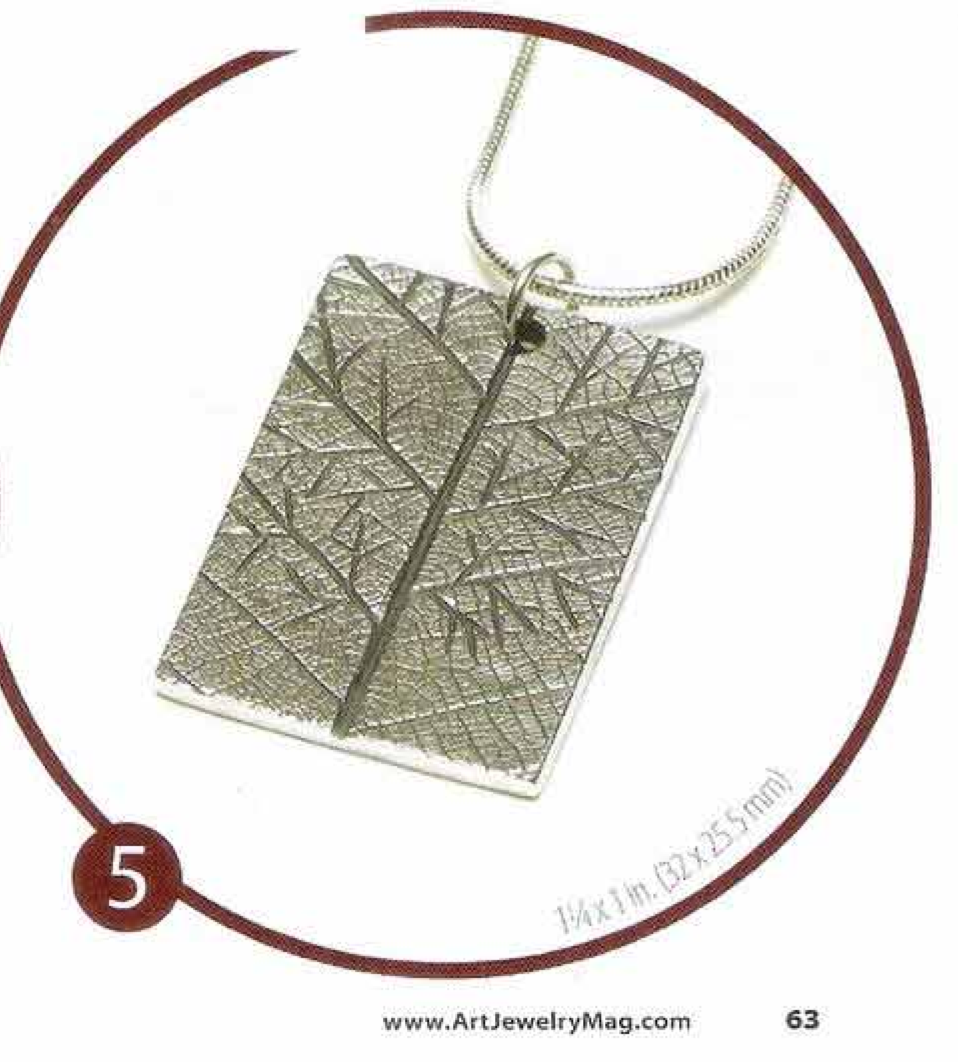
1¾ x 1½ in. (44 x 38 mm)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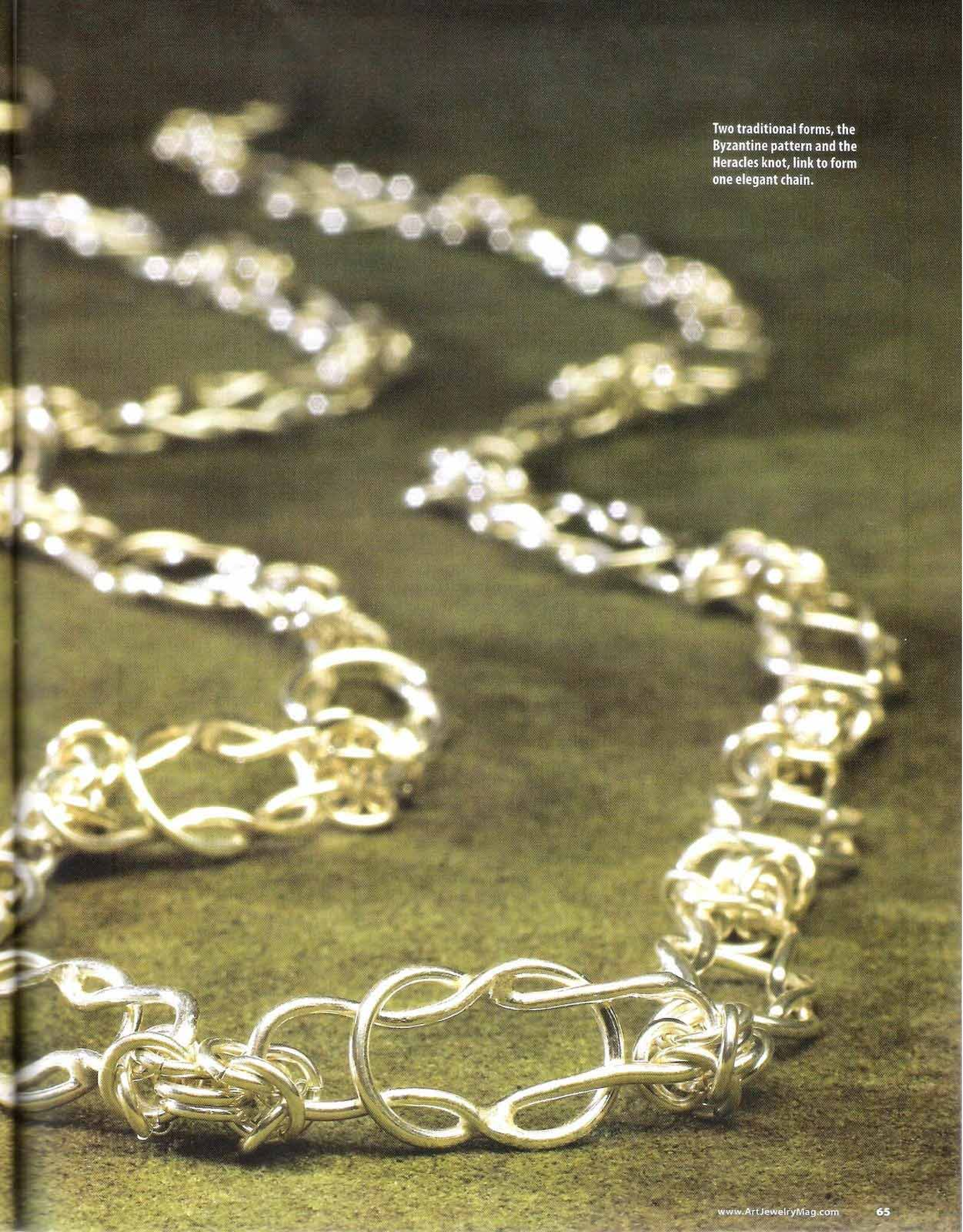
1¼ x 1 in. (32 x 25.5 mm)

Craft a Time-Honored Heracles Knot Necklace

This modern necklace marries two traditional chain-making motifs: the Heracles knot's shaped and interlocking rings, and the Byzantine chain pattern.

by Howard Siegel

The Heracles knot, with its interlinked halves, is a centuries-old visual motif symbolizing marriage, so it's use is fitting in this necklace, which marries two distinct traditional chain patterns. You'll use basic fusing and shaping to create the Heracles knots, then make Byzantine chain segments to connect them. These simple, easily mastered techniques result in an elegant chain.



Two traditional forms, the Byzantine pattern and the Heracles knot, link to form one elegant chain.

PART 1:
Heracles knots

Rings

Prepare the fine-silver jump rings for fusing. Fusing is a technique in which you heat metal (in this case, the cut ends of a jump ring) almost to its melting point in order to join it without using solder. Fine silver responds especially well to fusing.

To properly fuse your jump rings, their cut ends must be aligned flush. Use either a pair of chainnose pliers and your fingers or two pairs of pliers to grasp a jump ring. Slightly over-form the ring B C by bringing the ends of the ring past each other, then together so they touch and align.

Check the alignment of the join by looking at the closed ring from the edge and from above. Repeat to tightly close approximately 50 fine-silver rings.

NOTE: The cut ends of the rings must be in complete contact in order for the joins to fuse.

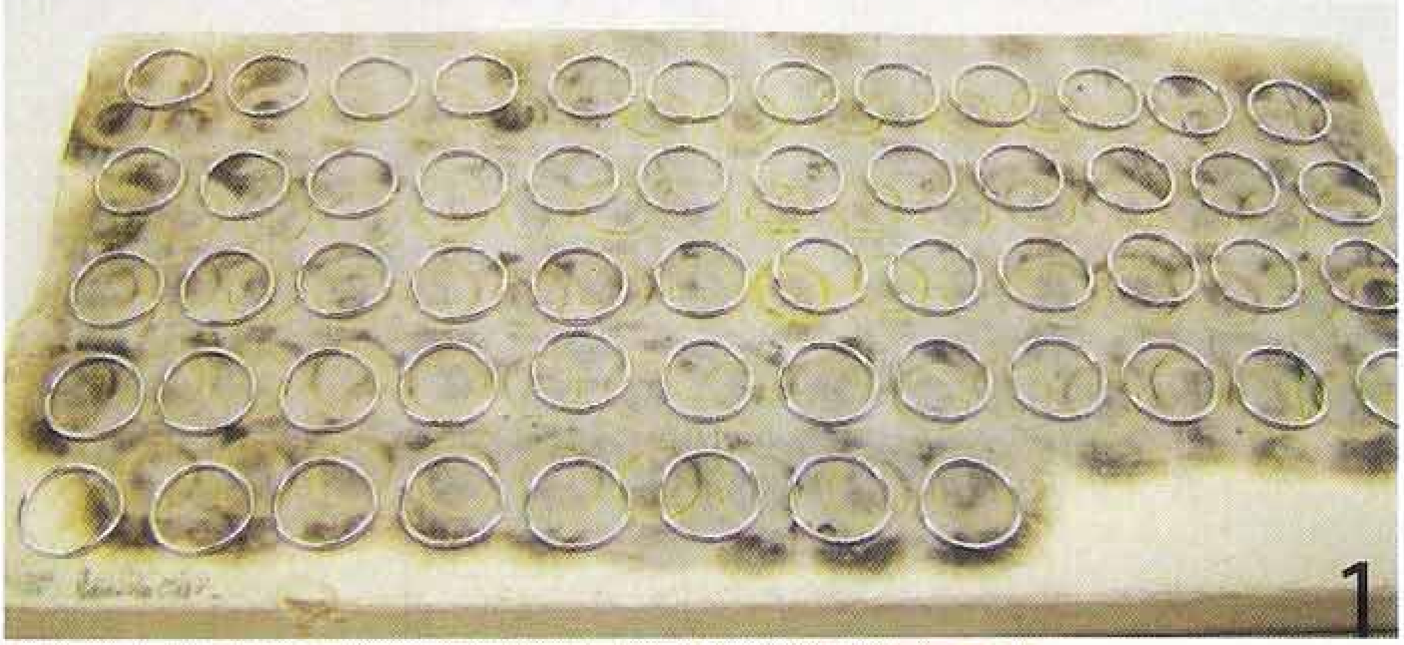
Place the closed rings in rows on a soldering pad so that the join of each ring faces the front of the pad **[1]**. Placing the rings so that each join is in the same relative position makes it easier to find and watch the joins during fusing.

Prepare to fuse. Place the soldering pad on a firebrick; this raises the pad above the surface of your bench, minimizing the possibility of burning your benchtop. At this point, I like to put on my Optivisor; its magnification helps me see the tiny joins more clearly.

TIP: When you're fusing, dim the room lights. Each ring will turn red and "flash" when its join fuses; you'll be able to see these changes better in a dark room.

Fuse the jump rings. Light your torch and adjust the flame to about half of the flame length available. Starting with the jump ring at the left rear of the soldering pad, move the tip of the flame in a circular motion over the ring, following the jump ring's shape.

When the ring becomes dull red, move the flame tip to the ring's join, and move the flame in a tight circular motion, uniformly heating both sides of the join **[2]**. Watch for the metal at the join to flow; when the metal flows, its surface becomes more reflective. This is called the "flash."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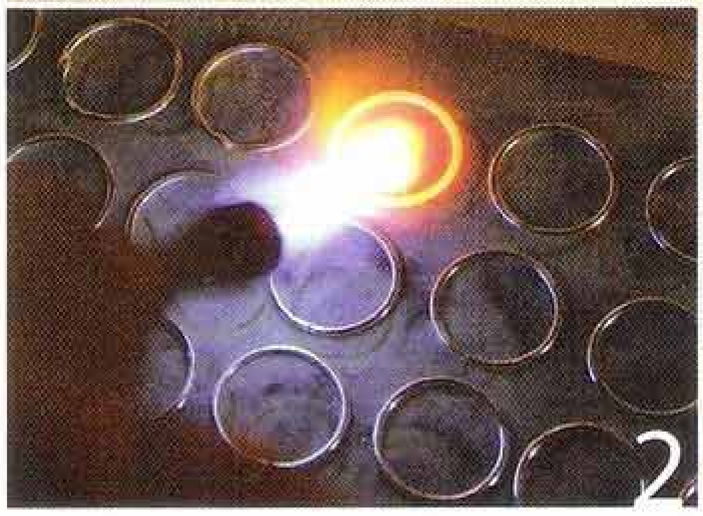
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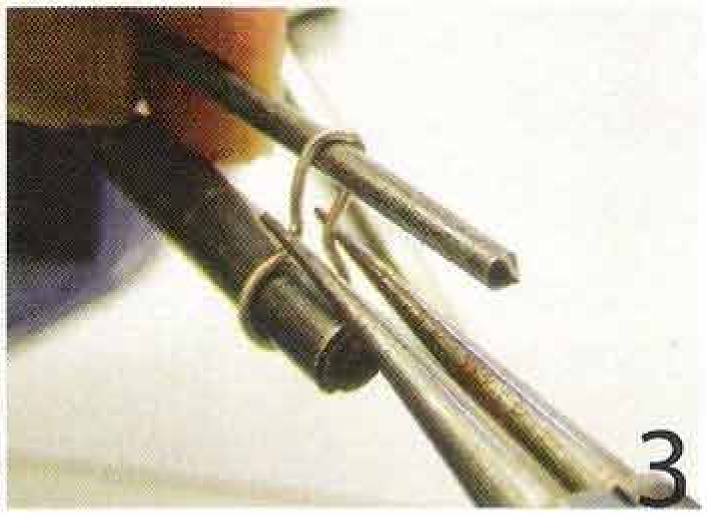
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NOTE: When you see the flash, immediately remove the flame. Overheating will result in thinning the ring at the join or completely burning through the ring.

Fuse all the rings, moving from left to right along the last row of rings, then from right to left along the next row forward.

Form the rings. Secure a 7 mm (9⁄32-in.) mandrel horizontally in a bench vise. Slide a fused fine-silver ring onto the mandrel. Pull the ring up against the bottom of the mandrel so that there's space in the ring above the mandrel.

Place a 3 mm (1⁄8-in.) mandrel through the ring above the 7 mm (9⁄32-in.) mandrel. Pull up gently with the 3 mm (1⁄8-in.) mandrel to elongate the ring.

Using roundnose pliers, gently squeeze the stretched ring adjacent to the 7 mm (9⁄32-in.) mandrel **[3]** and then adjacent to the 3 mm (1⁄8-in.) mandrel. The objective is to form each ring so that the finished shape resembles a keyhole. The elongated sides of the ring should be parallel.

NOTE: Squeezing the ring with the roundnose pliers will probably not result in a perfectly shaped keyhole; run the 3 mm (1⁄8-in.) mandrel along the elongated sides of the ring to make them parallel.

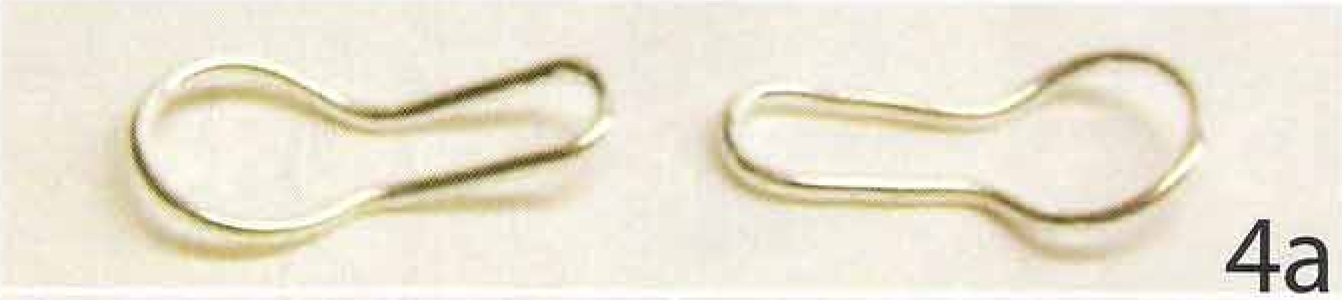
Form all the fine-silver rings into the keyhole shape.

Bend the rings. Using chainnose pliers, grasp across the circular part of a keyhole-shaped ring. Using your fingers, bend the elongated end up about 20°. Repeat to form all the keyhole rings.

Knot assembly

Form the Heracles knot. Position two of the keyhole rings so that the elongated ends face each other **[4a]**. Slide each elongated end into the opposite circular opening **[4b]**, pulling the ends until the keyhole rings nest snugly **[4c]**. Slightly bend each elongated end to hold the rings in place.

You may need to use chainnose pliers to grip the two ends to pull the rings together. Try to pull all the Heracles knots to the same shape. You should end up with approximately 25 knots (you may have melted or deformed some rings during fusing).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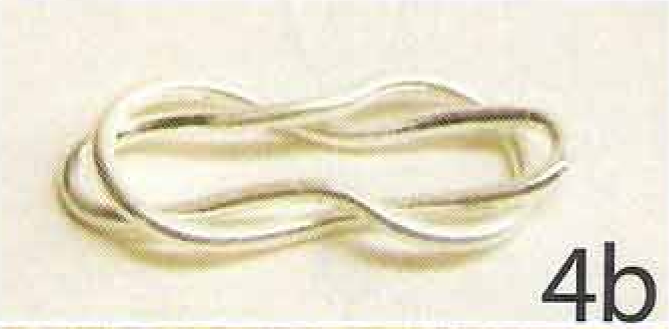
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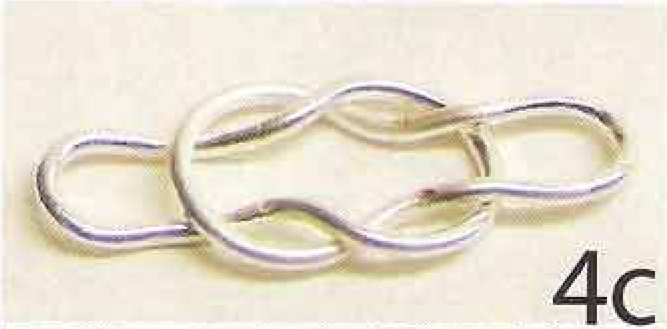
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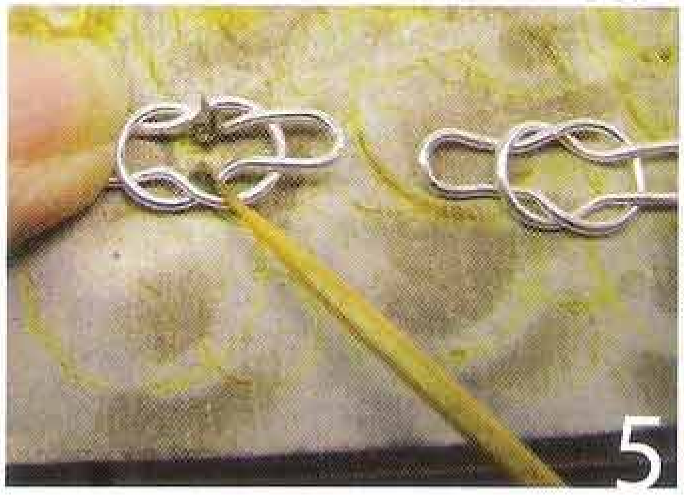
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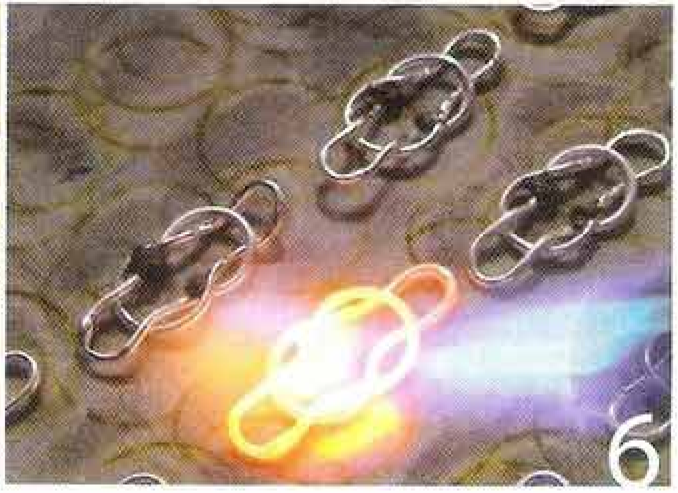

6

materials

- Fine-silver jump rings: 18-gauge (1.0 mm), 12 mm inside diameter (ID), approximately 50
- Sterling silver jump rings:
  - 20-gauge (0.8 mm), 3 mm ID, 200
  - 16-gauge (1.3 mm), 4–5 mm ID, 2
- Lobster claw clasp: 13 mm

toolboxes, *page 88*

- Chain mail
- Soldering

additional tools & supplies

- Pliers: roundnose
- Optivisor or other magnifier
- Mandrels: 7 mm (9/32 in.), 3 mm (1/8 in.)
- Bench vise
- Skewer
- Paste solder: easy or extra easy

See Suppliers, *page 93*
See Safety Basics, *page 89*

Solder the Heracles knots. Place the assembled knots on the soldering pad in rows. For each knot, use a skewer to place a small amount (about the size of two pinheads) of easy or extra easy paste solder on the inside of the knot at the two points where the wires cross **[5]**.

Use your torch to heat each knot until the paste solder flows on each join **[6]**.

Pickle the soldered knots, rinse them in running water, and blot them dry with a paper towel.

PART 2:
Byzantine chain

Make the first Byzantine knot. Open 200 20-gauge (0.8 mm) sterling silver jump rings about 60°.

Place a twist tie or paper clip through one end of a Heracles knot. Slide a jump ring through the other end of the knot, and close the ring. Repeat with a second jump ring.

Slide a jump ring through both of the jump rings you just added, and close it. Repeat with a second jump ring.

The configuration should now be two jump rings through two jump rings, which are through one end of a Heracles knot.

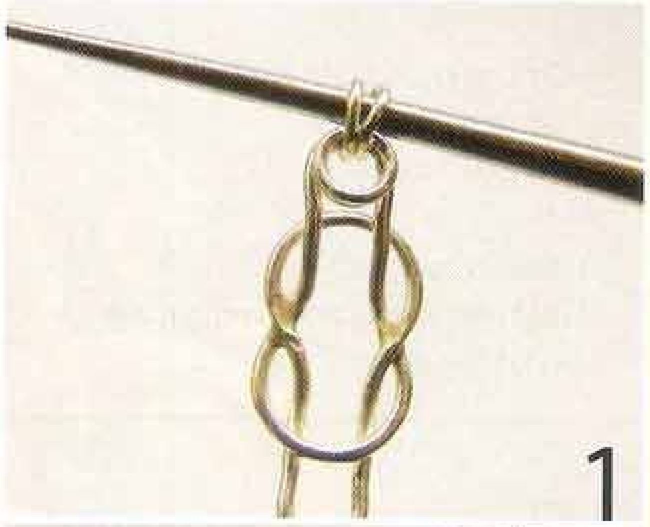
Separate the second pair of rings so that one ring falls to each side. Place an awl through the first pair of rings, and allow the second pair of rings to fall so that they lie next to the Heracles knot **[1]** on each side.

Grasping the Heracles knot and the two rings beside it, remove the awl. Push the second two jump rings up inside the first two rings.

Use the awl to separate the first two rings, exposing the upper curve of the second two rings. Insert the awl through the second pair of rings **[2]**, causing the rings to move into the proper position.

NOTE: Do not put the awl through the Heracles knot. The awl should be above the knot.

Remove the awl. Grasp the flat side of the Heracles knot and the jump rings with your thumb and forefinger to hold the rings in place with an opening between the "V" formed by two of the rings. (This was the space occupied by the awl.)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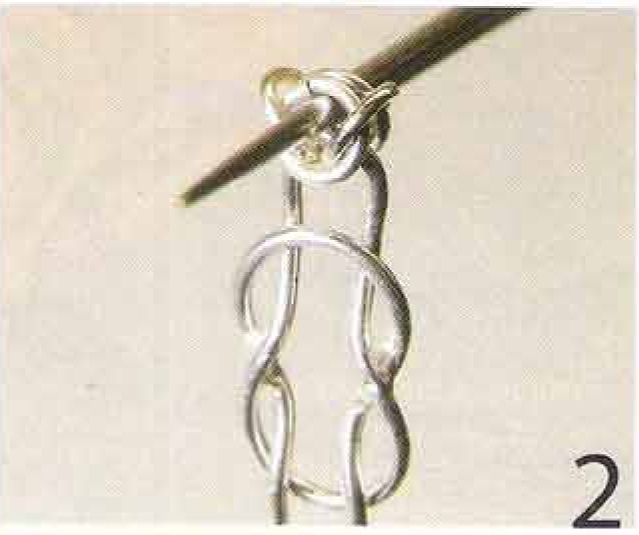
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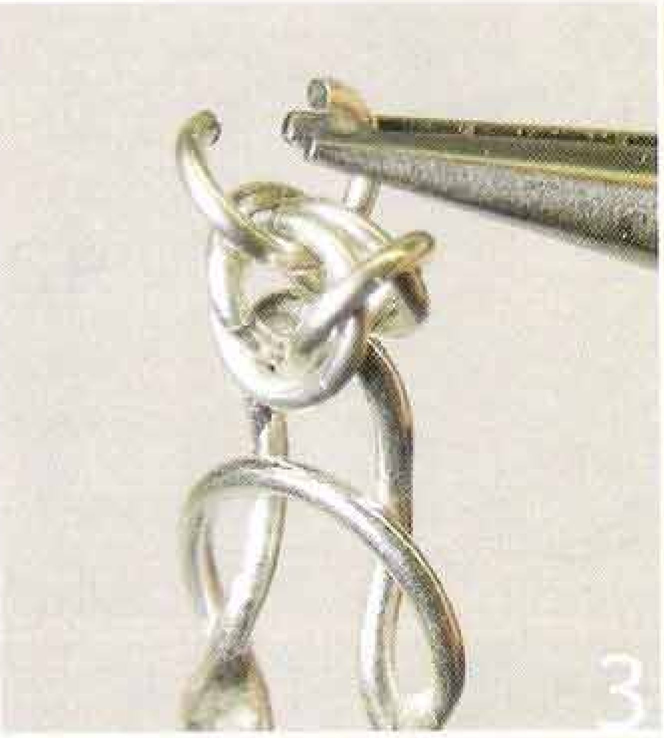
Slide a jump ring through the opening in the V formed by the first four rings **[3]**. Close this ring just enough that it cannot come loose; do not close it completely. You have formed a Byzantine knot.

Connect a second Byzantine knot. Add two pairs of jump rings to one end of a second Heracles knot. Form a Byzantine knot as before.

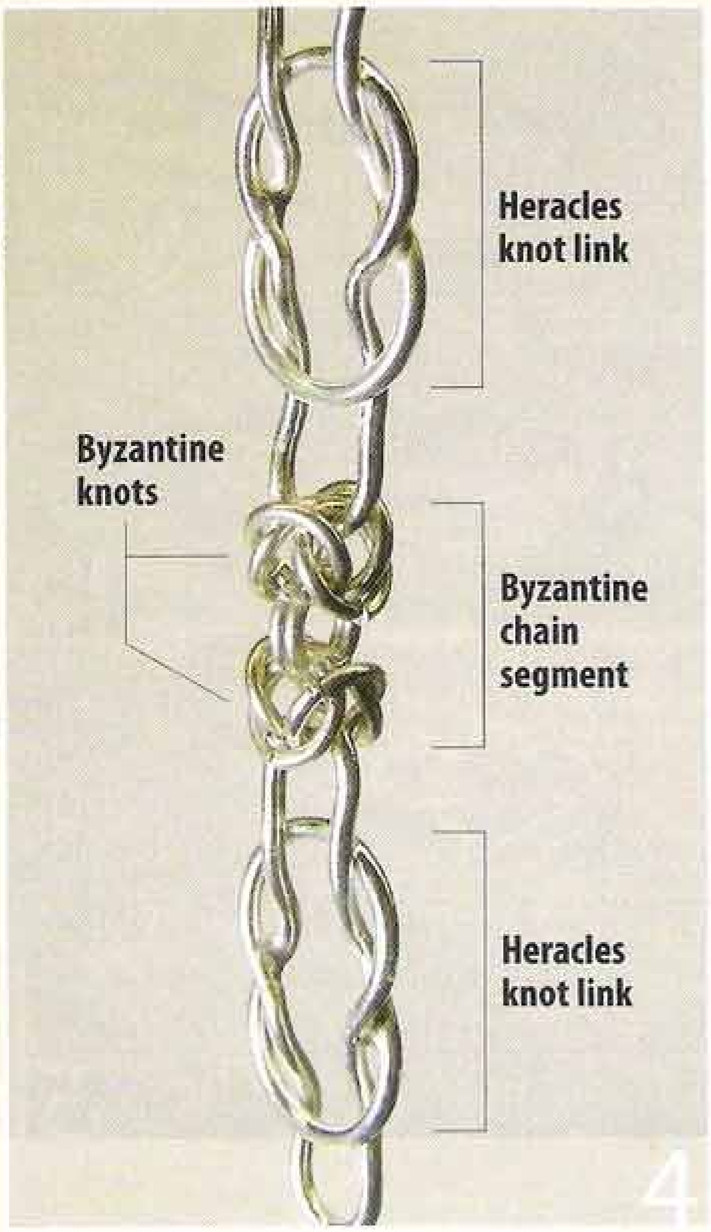
Slide a jump ring through the V in the knot. While this ring is still open, slide it through the V in the Byzantine knot that you formed on the previous Heracles knot. Close the ring. Open the partially closed ring in the center of the first Byzantine knot, insert it through the V in the second Byzantine knot, and close the ring.

NOTE: At this point, you should have a symmetrical Byzantine chain segment between two Heracles knot links; a Byzantine knot should be adjacent to each Heracles knot and two jump rings should connect the Byzantine knots **[4]**.



Continue connecting the Heracles knot links with Byzantine chain segments until the chain reaches the desired length.

NOTE: If you have any surplus Heracles knots, you can make matching earrings simply by adding ear wires.



Process photos by Howard Siegel.

Videos & Basics

Check out these bonus tutorials for fundamental techniques used in this project:

- Opening and closing a jump ring B ▶
- Tumble-polishing B ▶

B **Basics,** ***page 87***

▶ **Videos, www.artjewelrymag.com/videos**

PART 3:
Assembly and finishing

Add the clasp. Remove the twist tie or paper clip from the starter Heracles knot. Slide a 16-gauge (1.3 mm) jump ring through the end Heracles knot, and slide a lobster claw clasp onto the jump ring. Close the jump ring.

The clasp can hook through the last Heracles knot on the other end of the chain. Or, if needed, add a second 16-gauge (1.3 mm) jump ring to this end of the chain to properly orient the clasp.

Finish the necklace. Place the assembled chain into a tumbler, and tumble the chain B ▶ for about an hour. Tumbling will polish and harden the chain, as well as remove any burs that resulted when the jump rings were cut. Check to make sure that there are no remaining burs; if there are, tumble again for as long as needed to remove the burs. Additional tumbling will not damage the chain.

TIP: Chain necklaces are less likely to tangle while they are being tumbled if you close the necklace's clasp. AJ

ACKNOWLEDGMENTS

I learned to make this chain from information derived from the following sources:

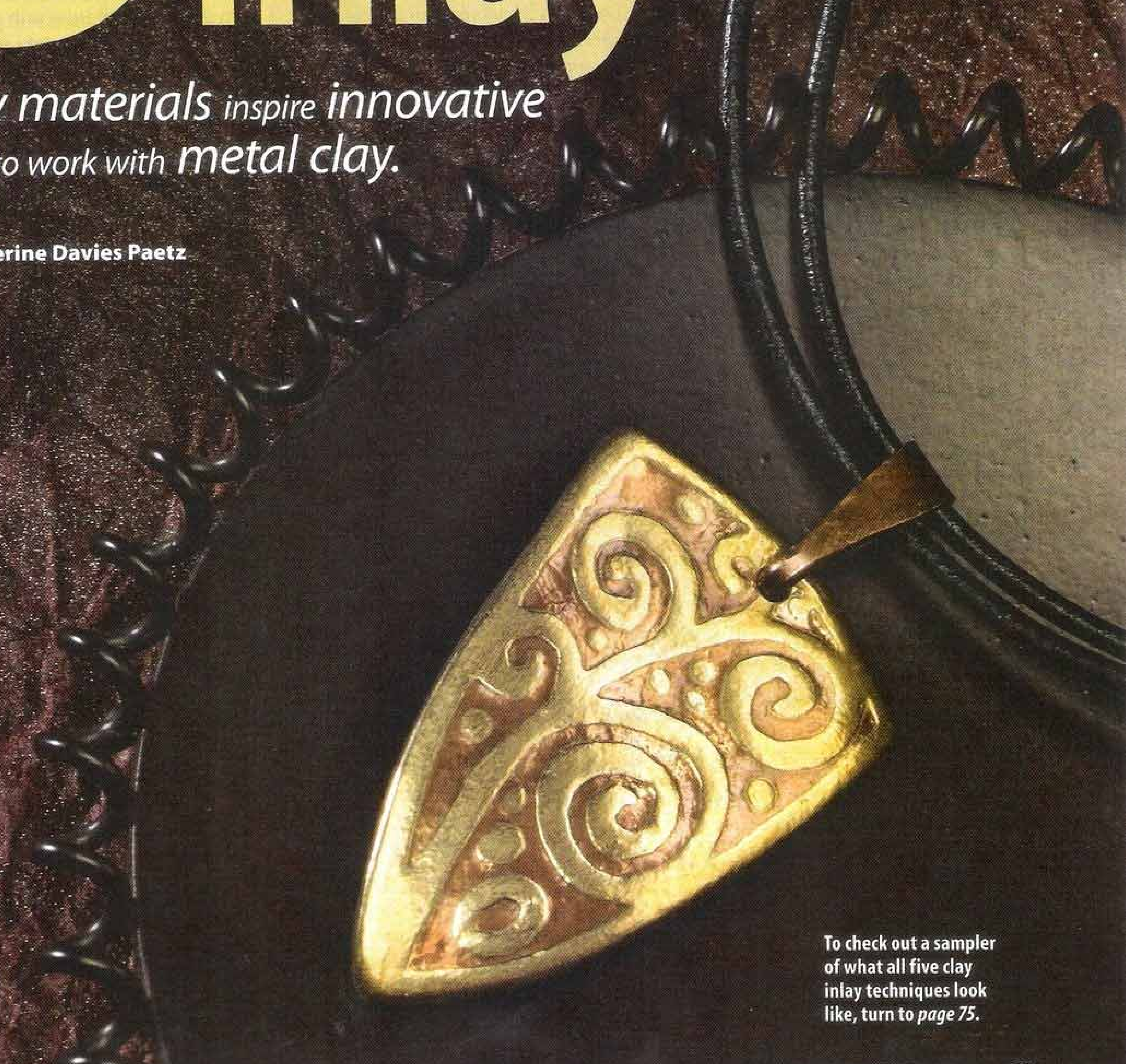
- Untracht, Oppi. *Jewelry Concepts and Technology.* Doubleday, 1982.
- McOmber, Robert W. *Chain Making.* 1976.
- Jean Reist Stark and Josephine Reist Smith. *Classical Loop-In-Loop Chains and Their Derivatives.* Brynmorgan Press, 1999.

BRONZE & COPPER CLAY:

5 Ways to Inlay

New materials inspire innovative ways to work with metal clay.

by Catherine Davies Paetz



To check out a sampler of what all five clay inlay techniques look like, turn to *page 75*.

The recent arrivals of bronze clay and copper clay on the metal clay scene have introduced new colors to the metal clay artisan's palette. Not only are these clays visually striking in their own right, but they also offer endless possibilities for making dynamic designs when combined. I've been experimenting with various processes that inlay bronze and copper metal clays and have achieved beautiful results.

Here are five techniques I've developed for making copper and bronze metal clay inlay designs. Look for tips and troubleshooting information on drying and firing along the way. As you explore these techniques, you'll probably come up with a few more ideas on how to marry these warm-hued metal clays.

Good stuff to know before you start experimenting

Results will vary

Bronze metal clay and copper metal clay are new materials that artists are learning more about every day. My primer will get you started on combining these materials, but expect varying results depending on whether you inlay the bronze into the copper or vice versa.

Keep an open mind as you experiment. These clays have a reasonable price point, so making a test of your inlay design before you finalize a piece is an economical option.

NOTE: I used BRONZclay and COPPRclay for my experiments and projects. Firing schedules vary between brands, so if you use a different brand, follow that manufacturer's instructions for working with the clay and for drying and firing your pieces.

Thickness guide

The base layer of clay for your inlay design should be at least 5 playing cards thick so that it can accept an impression that's 2–3 cards thick. Maintaining the base layer at a thickness of 5 cards preserves the integrity of the piece, which will become thinner as you remove excess clay to refine the inlay layer.

Prevent warping

A mug warmer or dehydrator works best for drying the clay. *Flat pieces must be turned often in order to prevent them from warping.* To minimize warping, watch the piece carefully, turning it approximately every 60 seconds or more often if the edges begin to curl.

NOTE: Some warping can be corrected during the inlay step, when you'll wet the impressions in the base layer before adding the inlay clay.

Surface

To achieve a level surface, inlay bronze into copper with approximately equal amounts of each of the clays visible. Allow the piece to dry completely and then sand the surface. After sanding, fill any sunken inlaid areas with clay.

Because the clay shrinks as it dries, I like to leave some inlay clay above the surface of the base layer's impressions. Allow the piece to dry completely, then fire it according to the manufacturer's instructions. Clay that is inlaid into thin lines might sink slightly during firing.

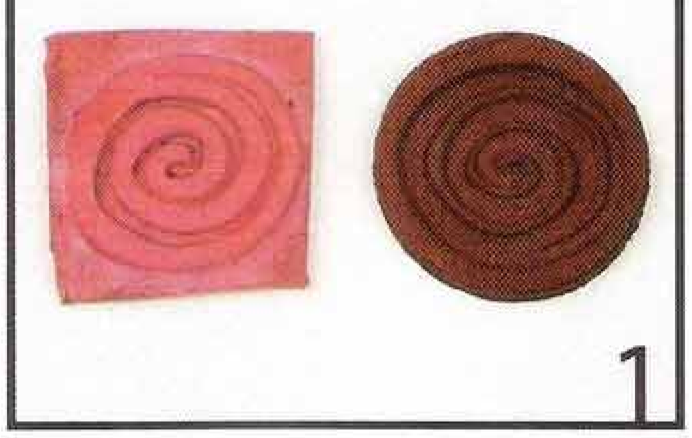
NOTE: After firing, you can sand or grind an uneven surface level using sanding paper or sanding disks in a flex shaft. However, this might leave marks in the copper, which is softer than bronze.

Technique 1: Stamps

Roll out the clay B C. On a flexible Teflon sheet, use an oiled acrylic roller to roll out your bronze or copper clay to make a base layer of clay that's 5 or 6 playing cards thick. Apply one or two drops of olive oil to the surface of the base layer where you will stamp your design.

NOTE: Stamps with wide cuts rather than very thin cuts work best for this process.

Impress your design. Using even pressure, impress the stamp into the base layer 2–3 cards deep. Place the stamped clay on a mug warmer, and take steps to minimize warping. The stamped layer **[1]** must be completely dry (see the "Metal Clay Dryness" chart, *opposite*) before you add the contrasting inlay clay. (See "Inlay Contrasting Clay," *page 72.*)



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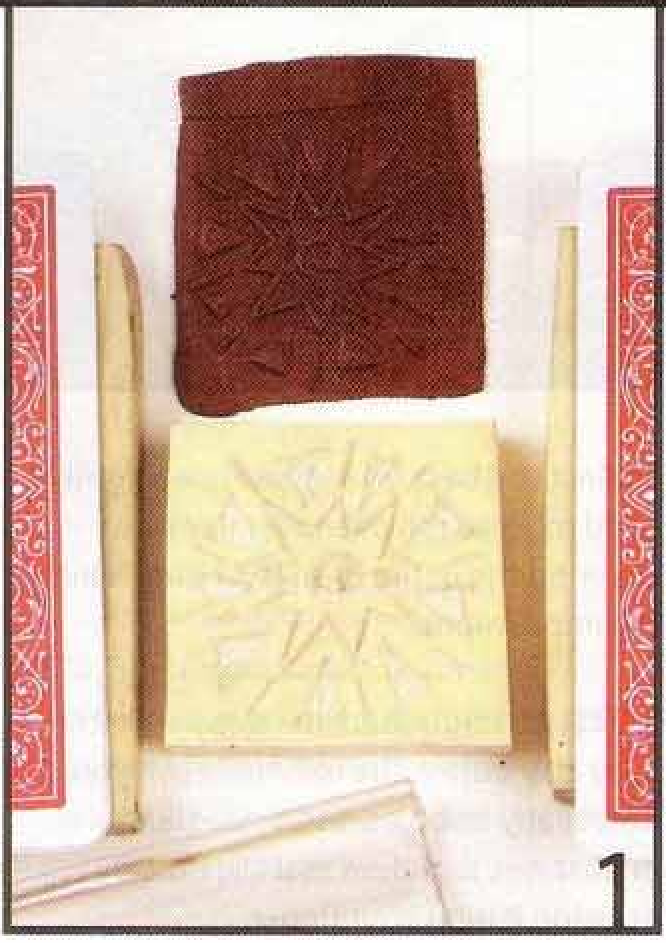
Technique 2: Carved eraser or photopolymer texture plate

Roll out the clay and impress your design. On a flexible Teflon sheet, use an oiled acrylic roller to roll out a base layer of clay that's 5 or 6 playing cards thick. Set the base layer aside.

Remove 2 or 3 cards from each stack of playing cards. Compensate for the thickness of the eraser or plate by raising the remaining stacks of cards to the same height as your eraser or plate. Position your eraser or plate texture-side up between the stacks of cards.

Lightly oil the surface of the clay, and roll the oiled side over the eraser or plate to impress your design **[1]**. Dry the impressed clay completely, taking steps to minimize warping. (See "Inlay Contrasting Clay," *page 72*.)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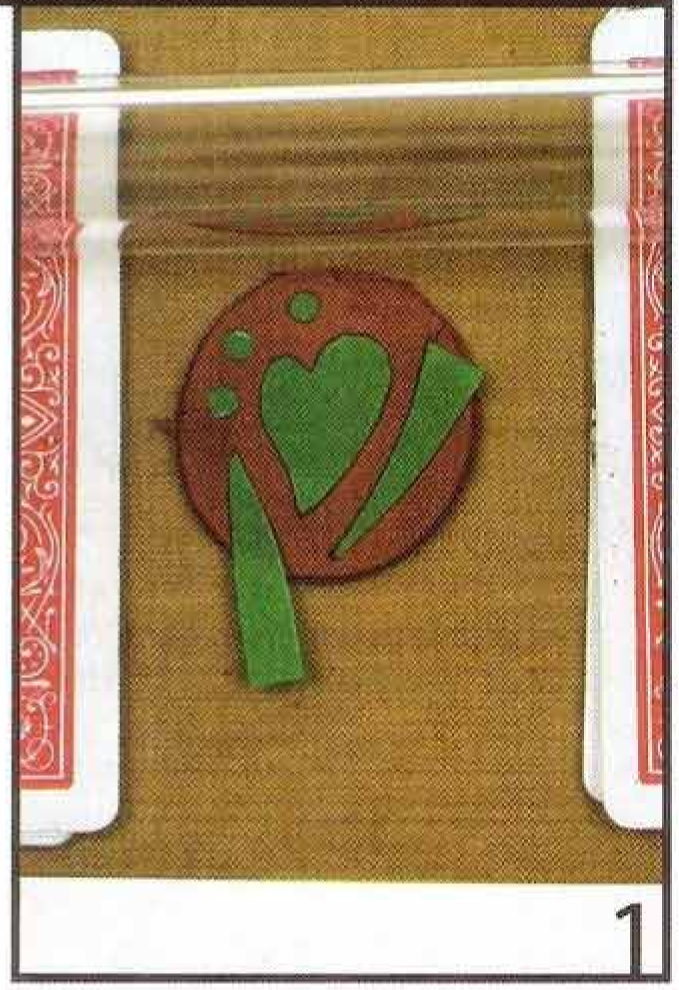
Technique 3: Plastic cutouts

Make cutouts. Draw shapes on heavy cardstock or plastic sheet, then cut out the shapes with a craft knife or scissors.

Roll out clay and place the cutouts. On a flexible Teflon sheet, use an oiled acrylic roller to roll out a base layer of clay that's 5 or 6 cards thick. Lightly oil the surface of the clay where you'll be placing your cutouts. Position the cutouts on the clay.

Impress the design. Roll an acrylic roller over the cutouts, pressing them into the clay **[1]**. Using the tip of a craft knife or your tissue blade, carefully remove the cutouts from the clay. Dry the impressed clay completely, taking steps to minimize warping. (See "Inlay Contrasting Clay," *page 72*.)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materials

- COPPRclay
- BRONZclay

toolboxes, *page 88*

- Metal clay
- Bronze clay

additional tools & supplies

- Stamps
- Cardstock or plastic sheet for cutouts
- Linoleum cutter (V or U shape), plastic eraser (optional)
- Craft wire: 18-gauge (1.0 mm) or 20-gauge (0.8 mm)
- Chasing hammer
- Steel block
- Cosmetic sponges
- Copper tongs
- Baldwin's Patina

See Suppliers, *page 93*
See Safety Basics, *page 89*

Videos & Basics

Check out these bonus tutorials for fundamental techniques used in this project:

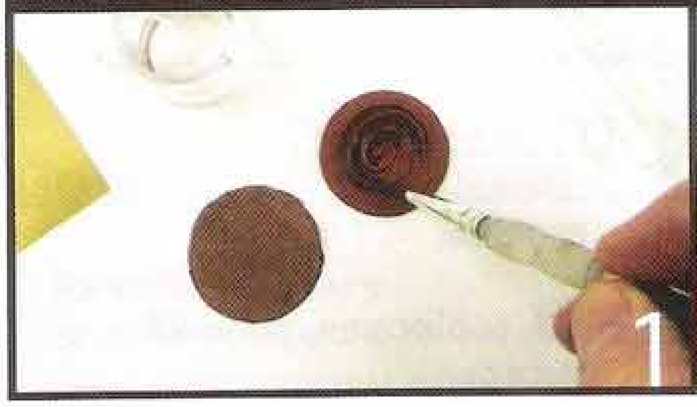
- Rolling metal clay B ▶
- Tumble-polishing B ▶

B Basics, *page 87*
▶ Videos, www.artjewelrymag.com/videos

Metal Clay Dryness

Wet	A lot of moisture; very pliable
Semi-dry	Some moisture; firm, holds its shape
Mostly dry	Nearly devoid of moisture; rigid
Completely dry	No moisture; can be fired

Techniques 1, 2, and 3:
Inlay contrasting clay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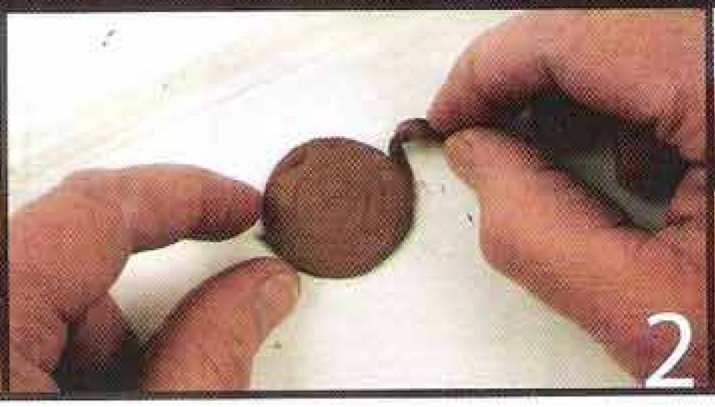
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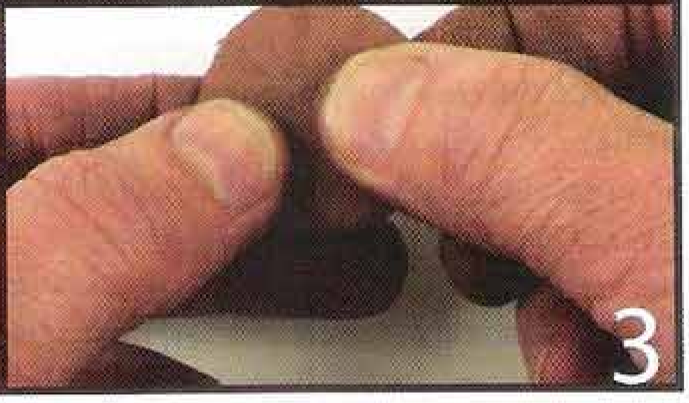
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Prepare the inlay clay. Roll out the contrasting clay to a thickness equal to or slightly thicker than the depth of the impression in your dried base layer (2–3 cards thick).

Prepare the base layer. Using a paintbrush and distilled water, thoroughly wet the impressions in the completely dry base layer **[1]**.

NOTE: If you add too much water, it will pool in the impressions, preventing the inlay layer from adhering to the base layer. Use a lint-free paper towel to wick excess water from the impressions.

Add inlay clay to a flat base layer. Lay the inlay clay over the base layer. To remove any trapped air, use your fingers to lightly press the inlay clay against the base layer. Then use a lightly oiled roller to roll over the inlay clay, covering the entire base layer and filling the impressions.

NOTE: Air might become trapped in the inlay clay during the rolling step. If you detect any bubbles, use a needle tool to prick them, and then seal the hole by pressing it with your finger.

Remove excess inlay clay. Use either your fingers or a craft knife to remove excess inlay clay from the sides of the base layer **[2]**. Then allow the piece to dry completely.

Add inlay clay to a curved or shaped base layer. After you've brushed the impressions in a curved base layer with distilled water, use your fingers to press the inlay clay into the impressions of the base layer **[3]**.

NOTE: Adding the distilled water can soften curved or shaped forms, so you might want to support curved base layers on an armature when you impress the inlay clay.

Remove excess inlay clay. Using your fingers or a craft knife, remove excess inlay clay. Allow the piece to dry completely.

Spot-fill depressions. Inspect your dry, inlaid piece for any significant depressions in the inlay area. Wet these areas with distilled water, and use your fingers to spot-fill them with inlay clay. Allow the piece to dry completely.

online extra

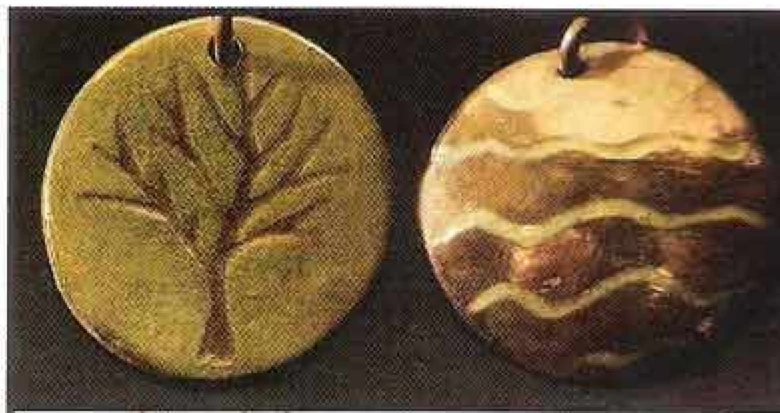
For more about the development of bronze clay, including what it's like to work with, check out "Now Entering the Bronze Age" (July 2008). Subscribers, if you don't have that issue handy, you can download the article free at www.artjewelrymag.com/onlinearticles. All readers can visit the same link to get Mardel Rien's in-depth look at BRONZclay firing procedures, including detailed firing charts and schedules.

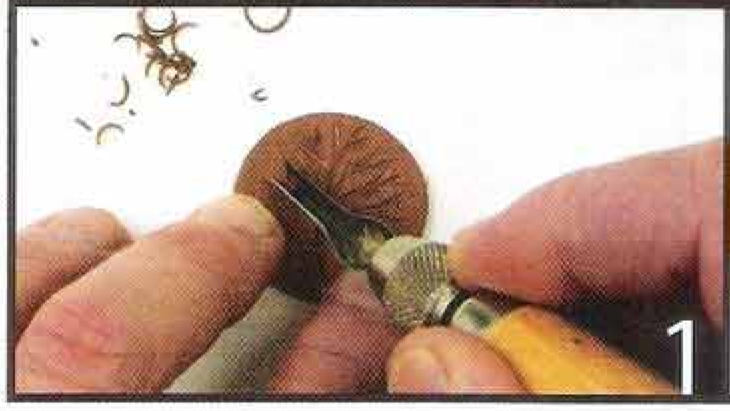
tool cleanliness

It's not necessary to have separate sets of tools for bronze and copper clays when you're using these clays together to make inlay pieces. Running a lightly oiled hand over the roller to remove crumbs of clay between uses will minimize the chance of introducing bits of clay where you don't want them.

NOTE: It's a good idea to keep a set of tools for silver metal clay separate from your tools for bronze and copper clay to prevent cross contamination.

Technique 4: Carved clay

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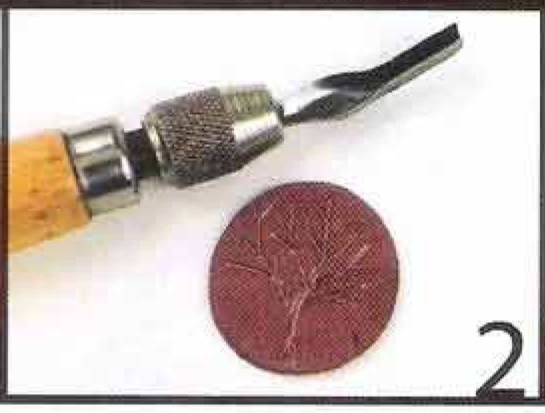
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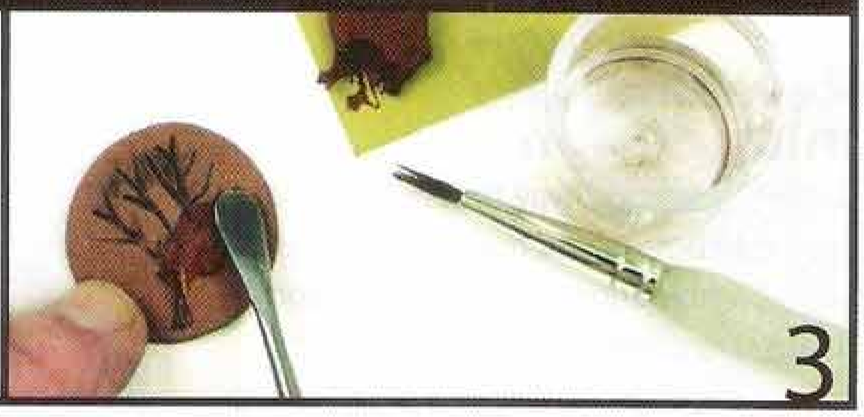
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Prepare the base layer. On a flexible Teflon sheet, use an oiled acrylic roller to roll a base layer of clay that's 5 or 6 cards thick. Dry it to a semi-dry state, taking steps to minimize warping.

Carve the base layer. Using a linoleum cutter, carve a design into the clay [1].

⚠ **SAFETY TIP:** Do not cut toward your body or your other hand.

TIP: When the carving pattern curves, rotate the clay instead of the cutter.

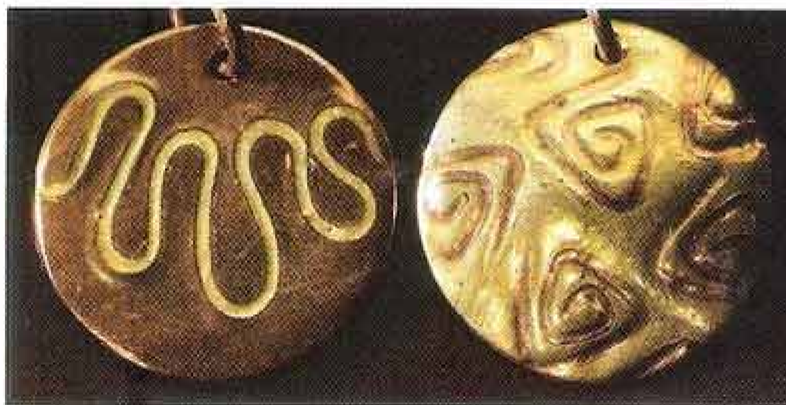
NOTE: Some people like to carve clay when it's in a semi-dry state; others prefer to carve clay when it's completely dry. Experiment with carving in various states of dryness to determine your preference.

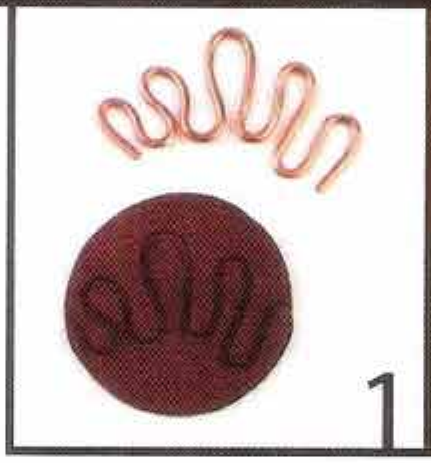
Allow the clay to dry completely [2], taking steps to minimize warping.

Add contrasting inlay clay. Using your paintbrush and distilled water, thoroughly wet the carved areas of the base layer. Using a small spatula or palette knife, generously "spackle" contrasting inlay clay into the recesses [3]. Allow the piece to dry completely.

If you detect any depressions in the dried inlay areas, wet these areas and use the spatula to spot-fill with inlay clay. Allow the piece to dry completely.

Technique 5: Wire impressions

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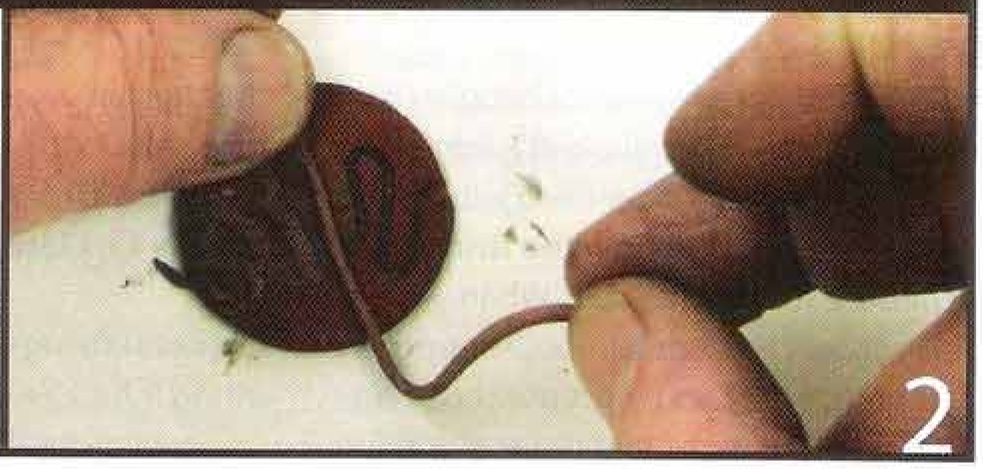
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Prepare the wire. Bend 18-gauge (1.0 mm) or 20-gauge (0.8 mm) wire into your desired shapes. Use a chasing hammer and a steel block to flatten the wire; flattened wire creates impressions with wider lines than nonhammered wire.

Prepare the clay. On a flexible Teflon sheet, use an oiled acrylic roller to roll a base layer of clay that's 5 or 6 cards thick. Lightly oil the areas of the base layer where you will impress the wire.

Impress the wire. Position the wire on the clay. Use your fingers or a flat piece of lightly oiled acrylic sheet to press the wire into the clay [1]. Remove the wire and allow the clay to dry completely.

Prepare the base layer. Use a paintbrush to wet the impression in the base layer with distilled water.

Prepare and impress the inlay clay. Use an acrylic sheet to roll thin cylinders of the contrasting inlay clay. Press the cylinders into the wet impressions [2], allowing the inlay clay to protrude slightly above the surface of the base layer; this compensates for the shrinkage of the inlay clay as it dries. Allow the piece to dry completely.

All techniques: Revealing the inlay design, firing, and finishing

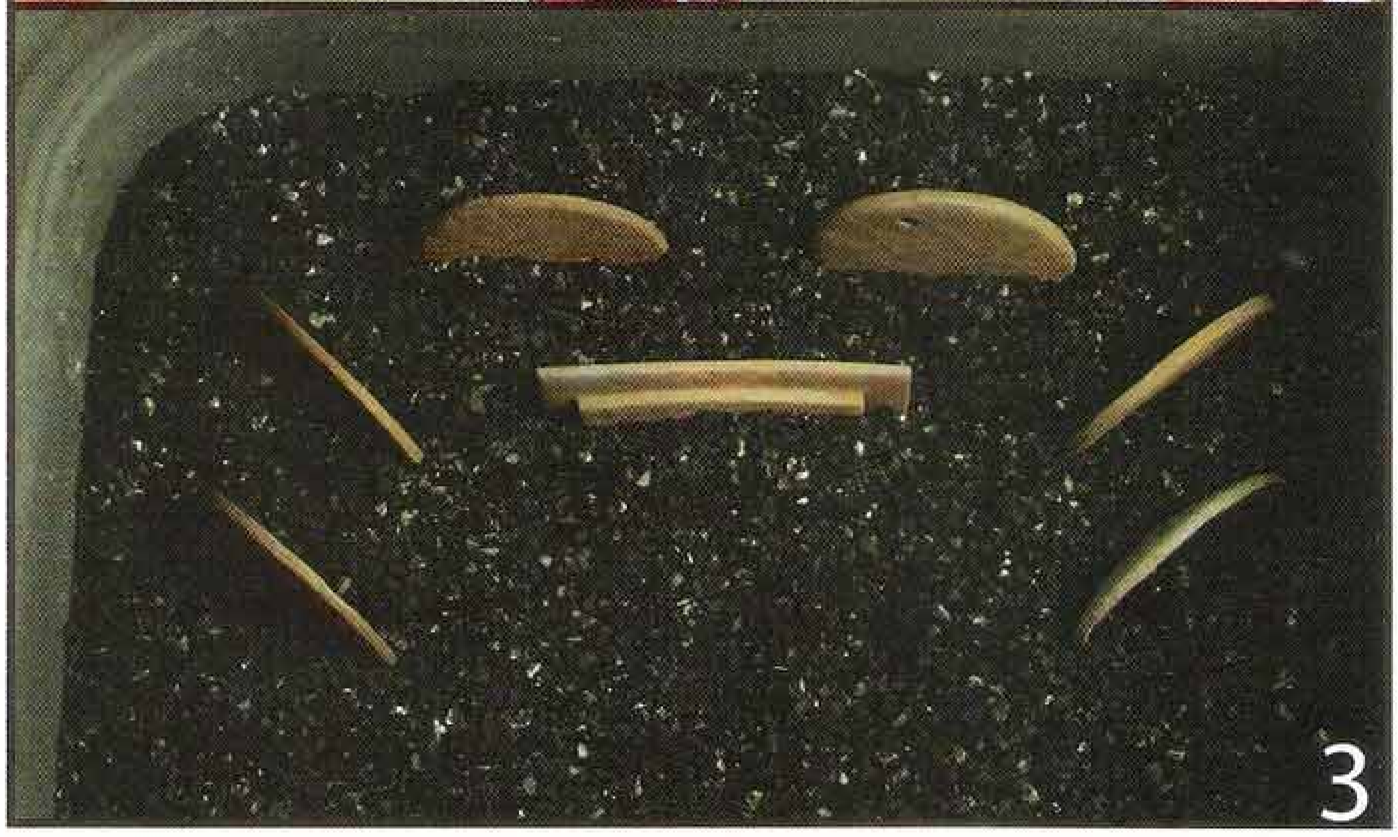
Revealing the inlay design

Generally, a good way to remove excess inlay clay before you fire your piece is to use a combination of dry sanding and damp sponging.

Sand the surface of your piece. Make sure your piece is completely dry, and then use a 120-grit emery board or sanding stick to remove excess inlay clay **[1]**. Remove just a little material at a time. When you begin to reveal the base layer of clay, progress to finer grits or switch to sponges.

NOTE: Curved pieces are especially vulnerable to overly aggressive sanding, because it's easy to remove too much material when sanding a rounded surface.

Sponge the surface. Moisten a cosmetic sponge with distilled water, and lightly wash away the excess clay **[2]**. Be sure to support curved or formed pieces, which will soften from the water. Sponging creates less sanding dust than emery boards and gives the clay a smooth surface. Allow the piece to dry completely.



Firing

NOTE: Firing bronze clay or copper clay requires a kiln, kiln stilts, and a lidded stainless steel container filled with activated carbon. **Follow the firing schedule for bronze clay.** When you're firing pieces that contain both copper clay and bronze clay, you must use the firing schedule for bronze metal clay. If you fire the pieces at the higher temperature that is recommended for firing copper metal clay, the bronze will blister.

Load the stainless steel container. Fill the stainless steel container about one-third full, or at least 1 in. (25.5 mm) deep, with the activated carbon. Place your pieces vertically or horizontally in the carbon, keeping them about ½ in. (13 mm) apart and away from the sides of the container **[3]**. Cover the pieces with about 1 in. (25.5 mm) of carbon and put the lid on the container. Set the container on the kiln stilts in the kiln, being careful not to push the kiln's thermocouple into the muffle. Close the kiln door.

General firing-schedule guidelines. The firing schedule depends on the thickness of your pieces. The thicker your pieces, the slower the ramp schedule.

Pieces ⅛ in. (3 mm) or less thick:
Ramp the kiln at 250°F (121°C) per hour to 1550°F (843°C), and hold for 3 hours.

Pieces thicker than ⅛ in. (3 mm):
Ramp the kiln at 125°F (51.6°C) per hour to 1550°F (843°C), and hold for 3 hours.

NOTE: Running the longer program for thinner pieces will not harm them.

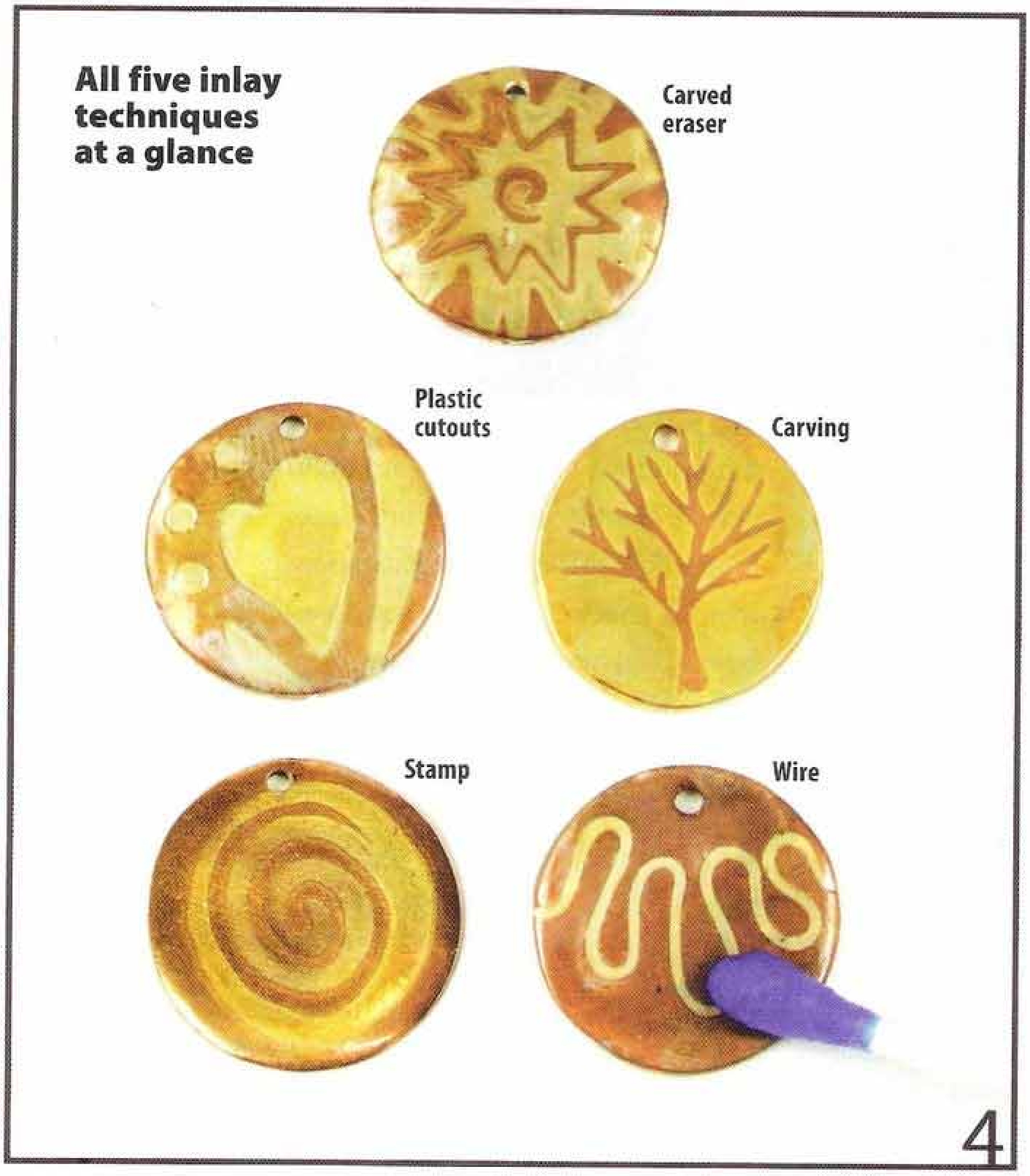
Allow the pieces to cool. Allow the kiln to reach room temperature, and remove the pan to a heat-proof surface.

Use tongs to remove the pieces from the pan.

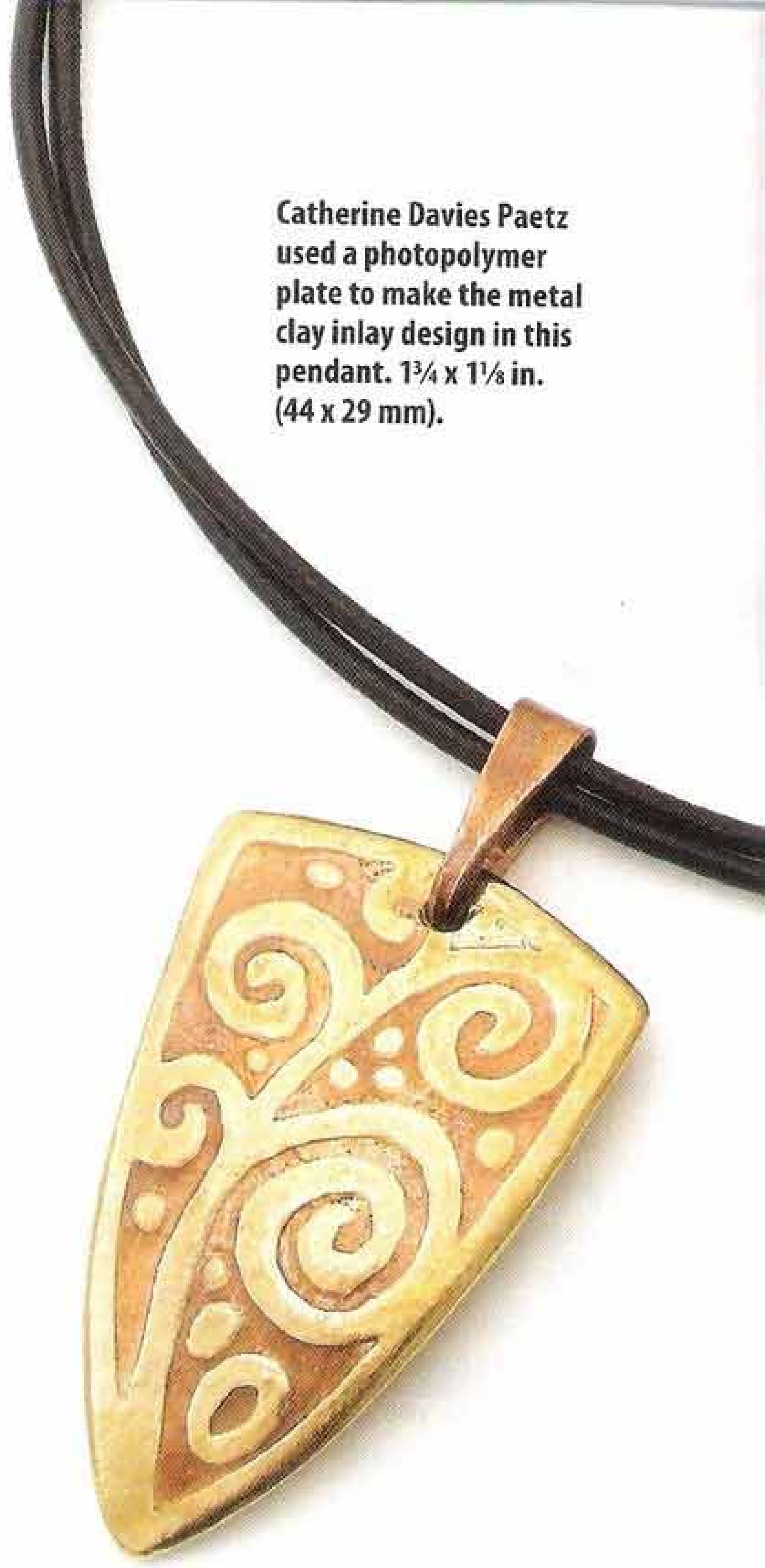
Check the pieces for cracks. Carefully inspect each piece. Any very fine lines

online extra

To learn kiln terminology, check out "Anatomy of a Kiln" at www.artjewelrymag.com/reference. The article is an excerpt from "The Care & Feeding of Your Kiln" (March 2009).



Process photos by Catherine Davies Paetz.



Catherine Davies Paetz used a photopolymer plate to make the metal clay inlay design in this pendant. 1¾ x 1⅛ in. (44 x 29 mm).

between the two clays may become less noticeable after tumble-polishing.

If you find significant gaps or cracks, fill them with fresh clay, dry the piece completely, and refire it at the shorter firing schedule.

Finishing

You can finish your inlay pieces with a brass brush and soapy water, or use a tumbler with steel shot and burnishing compound B C. The color contrast between the bronze and copper may not be very pronounced.

Apply a patina. To enhance the color contrast, use Baldwin's Patina according to the manufacturer's instructions. The patina will darken the copper but not the bronze.

Use a cotton swab to apply the patina to the surface of the piece. Then, rinse the piece with water and repeat until you achieve the desired color [4]. Then give the piece a final water rinse and dry it.

NOTE: Carefully building up the color works best. For a uniform finish, don't allow the patina liquid to pool or dry on the metal.

Tumble-polish. To give the surface of your piece more shine, tumble-polish it again for about 10 minutes after applying the patina.

related projects

For more projects like this, check out "Water Works" (September 2006) and "Kissed by the Sun" (May 2006). If you don't have those issues, you can buy PDFs of the individual projects at www.artjewelrymag.com/projects.

subscriber extra

Subscribers, for a bonus inlay technique from Catherine Davies Paetz, visit **www.artjewelrymag.com/reference** to download a free PDF tutorial of the "wet overlay" technique — it's her more freestyle approach to combining the clays.

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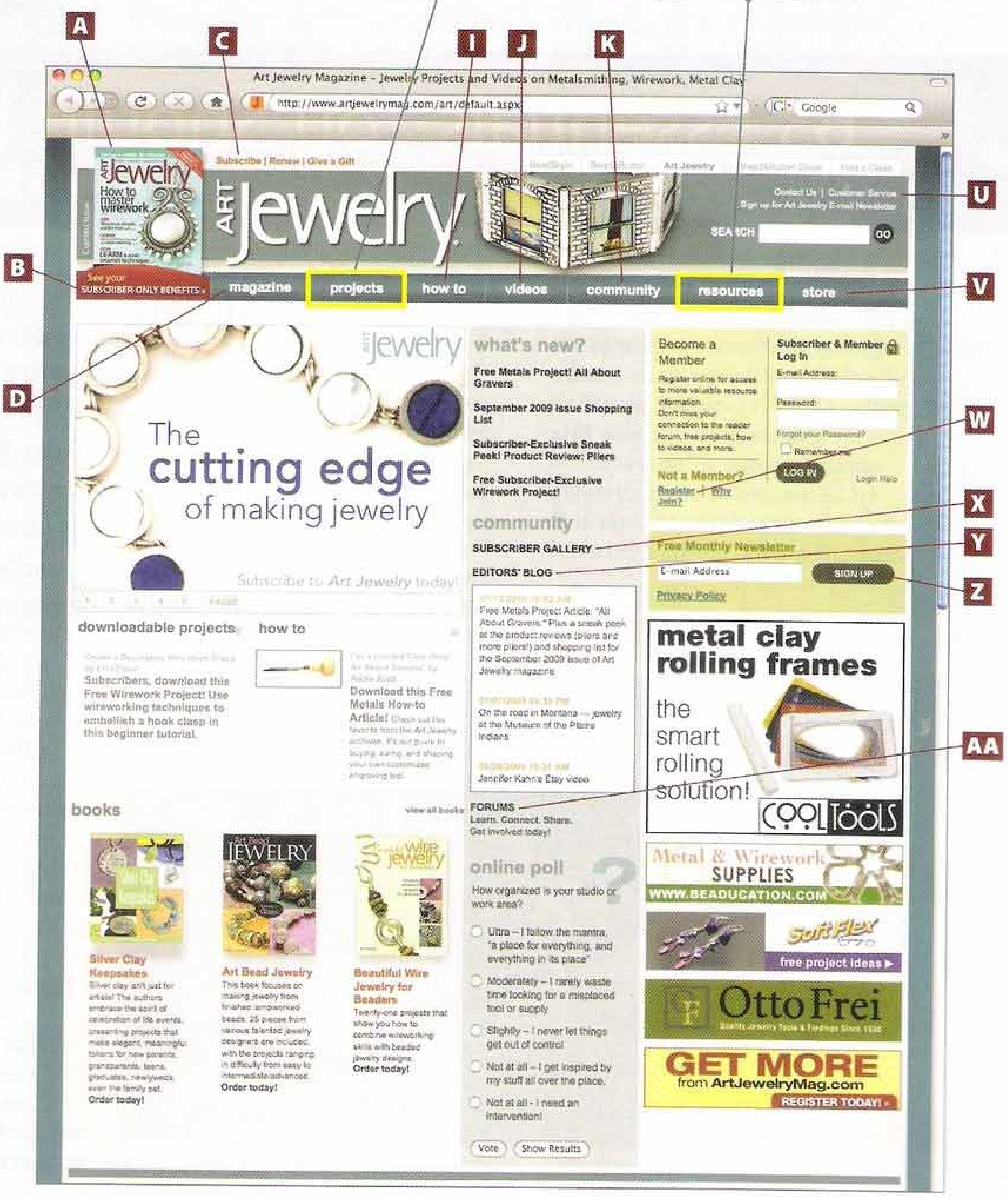
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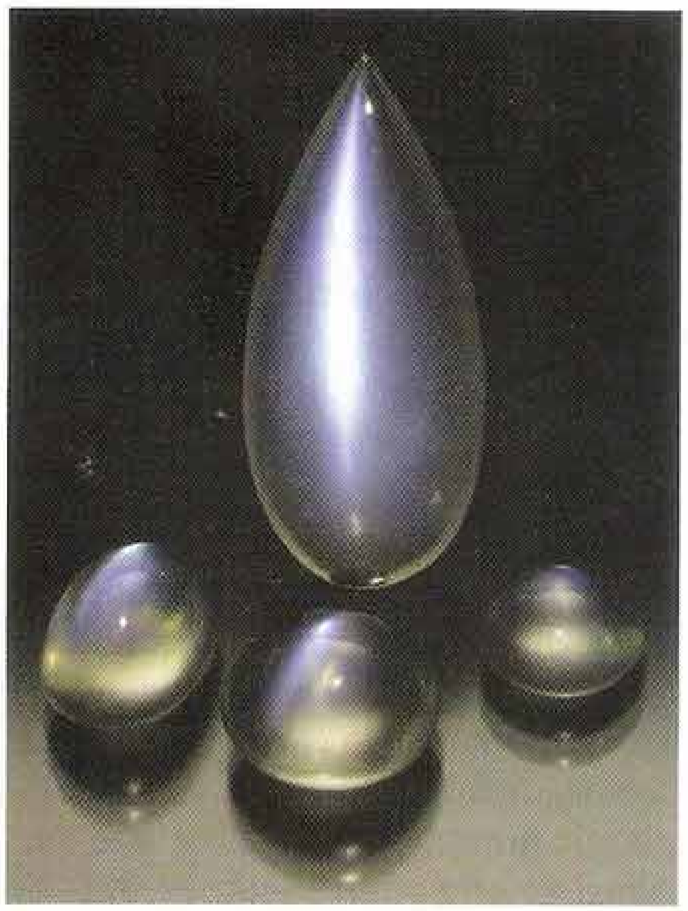
Gemstone Terminology:

63 Essentials You Should Know

by Sharon Elaine Thompson

If you've just started making jewelry or just begun adding gem materials to your work, you may find you're being bombarded with a slew of new and unfamiliar terms. This short glossary is a basic intro to some common terms from the fields of gemology (the science of gems) and lapidary (the art of cutting gems) that will help to get you in the know.



Adularescence is a floating bluish light also known as "the moonstone effect." Photo © Gemological Institute of America. Reprinted by permission.

Adularescence (or "the moonstone effect") The floating bluish light seen in the best quality moonstones; a *phenomenon* caused by the *interference* of light from microscopically thin layers of the two types of intergrown feldspar (orthoclase and albite) that make up moonstone. Some of the effect may be caused by minute particles in the stone scattering the light.

Asterism A *phenomenon* called "the star effect"; most well known in rubies, sapphires, and black sapphires. Caused by light reflecting off of needle *inclusions* that have grown at angles to one another.

The angles are determined by the mineral-crystal system in which the stone forms. Corundums (rubies and sapphires) form in the hexagonal system; they have three axes and six-legged stars. Garnets form in the cubic system; they have two axes and four-legged stars.

Before any stone is cut, the light reflecting from its inclusions appears as a silky sheen. In order for the reflecting light to form a star, the stone must be cut into a *cabochon*; the dome of the cab allows the light to reflect off the surface of the needles.

Aventurescence (or "schiller") A spangled, glittery *phenomenon* caused by light reflecting off of flat crystals inside a gemstone; most commonly seen in aventurine quartz and sunstone feldspar. The color of the aventurescence depends on the color of the stone's *inclusions*.

Blemish An imperfection, such as a scratch, a chip, or a *fracture*, on the surface of a stone.

Body color The dominant hue within a gemstone. The body color is best determined by viewing the stone *table*-side down under a light. See also *key color*.

Brilliance The amount of light, specifically white light, returned from a gemstone to the eye of the viewer; a combination of reflected surface light and light reflected from internal surfaces in *transparent* stones.

Cabochon A gemstone-cutting style in which the bottom of the stone is flat and the top is domed. Although *transparent* stones may be cut into cabs, the style is most often used for *translucent* or *opaque* stones, or to magnify or exhibit certain types of *phenomena*, such as *asterism* or *chatoyance*.

Cameo A gemstone-cutting style in which a design or image is raised above the surface of the stone. The most common cameos are made of shell. Usually the color of the image is in contrast to the background.

Cat's-eye effect See *chatoyance*.

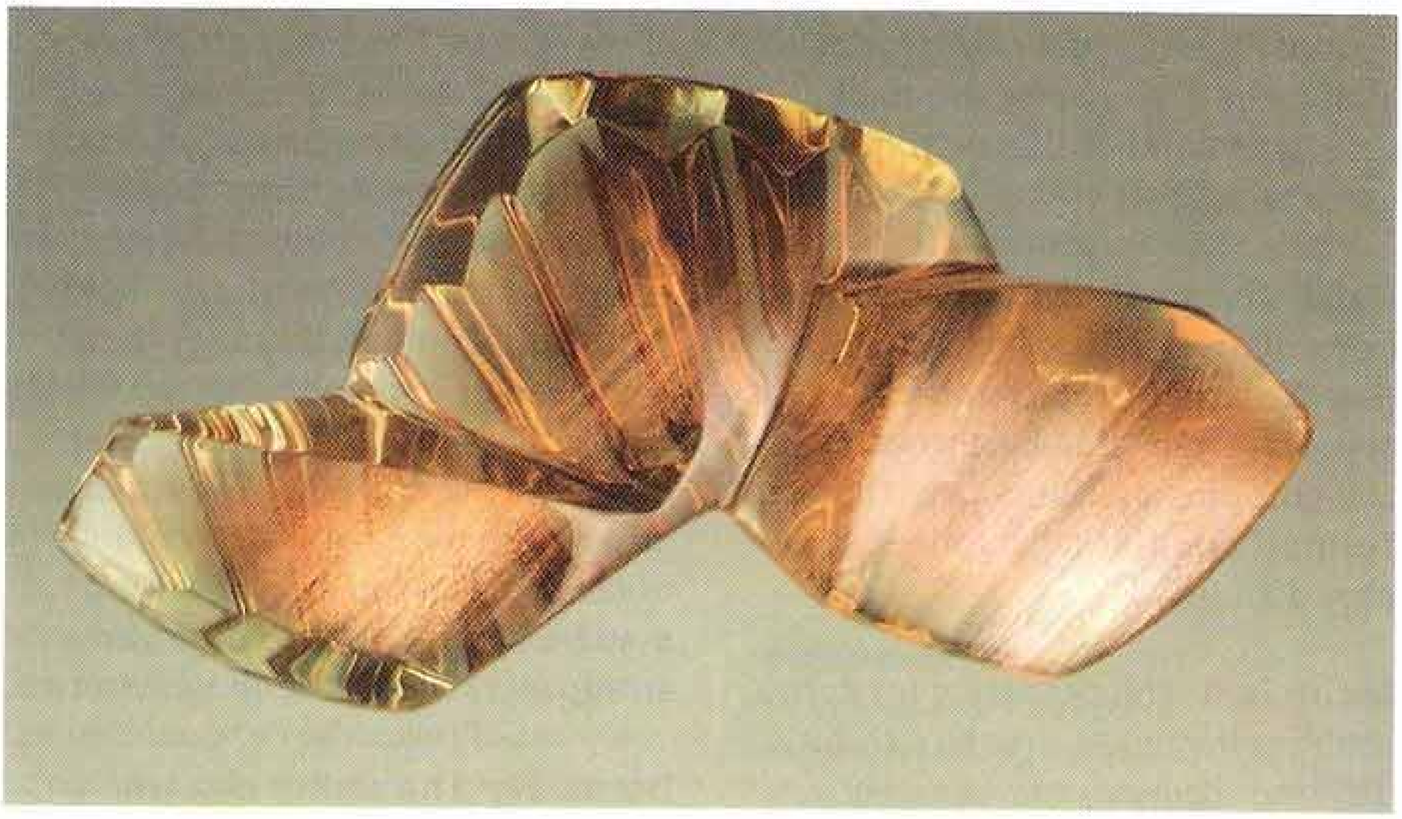
Chatoyance The "cat's-eye effect." A *phenomenon* caused by light reflecting off of needle *inclusions*. Unlike in *asterism* (the star effect), in the cat's-eye, needles are oriented in only one direction.

Before any stone is cut, the light reflecting from its inclusions appears as a silky sheen. To form a cat's-eye, the stone must be cut into a *cabochon*.

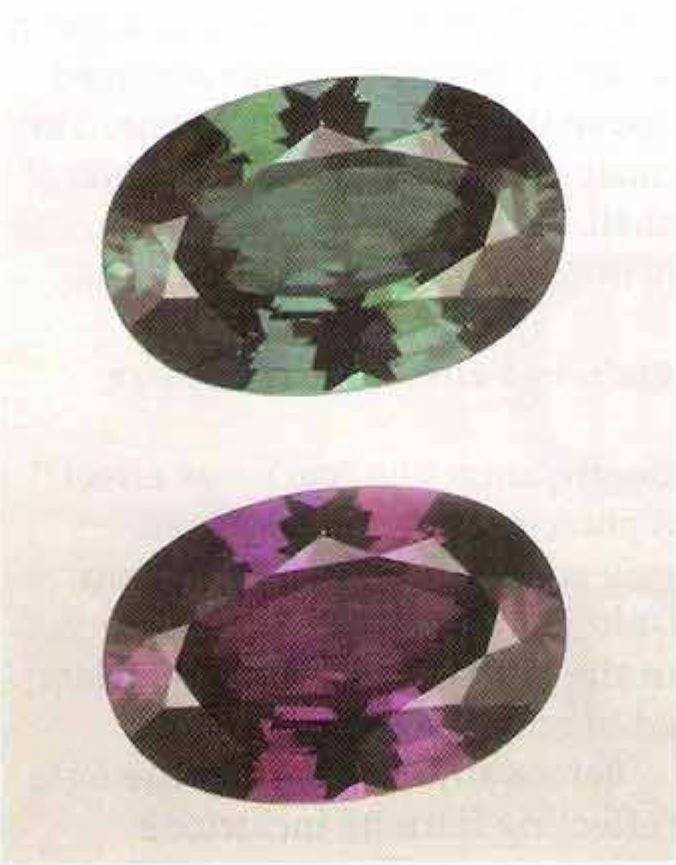
Cleavage The tendency for a *gem material* to break between planes of atoms, resulting in a flat, usually highly reflective surface.

Some gem materials, such as topaz and kunzite, cleave along these planes more readily than others, making the stones fragile or brittle. Be careful while setting and wearing such stones.

"Cleavage" is also the name given to an *inclusion* caused by this kind of break when the break remains entirely within the stone.



Aventurescence (or "schiller") is commonly seen in sunstone feldspar. Gem courtesy of John Dyer & Co.



The same alexandrite exhibits different colors in daylight, *top*, and incandescent light, *bottom*, demonstrating "color change."
Photos © Gemological Institute of America. Reprinted by permission.

Color change (or "the alexandrite effect") A *phenomenon* that causes gemstones to appear different colors depending on whether they are seen in fluorescent or incandescent light; caused by the interaction of light with the atomic structure of the stone. Most pronounced in alexandrite chrysoberyls; stones that exhibit color change are often described as alexandrite-like.

Conchoidal fracture A curved or shell-like break within or on the surface of a stone.

Crown The top of a *faceted* gemstone; the area above the *girdle*. (See "Anatomy of a Gemstone," *opposite, top.*)

Culet The small flat *facet* on the apex of a faceted stone's *pavilion*. (See "Anatomy of a Gemstone," *opposite, top.*) A culet helps prevent the chipping and breakage that can result if two flat facets meet at a sharp angle.

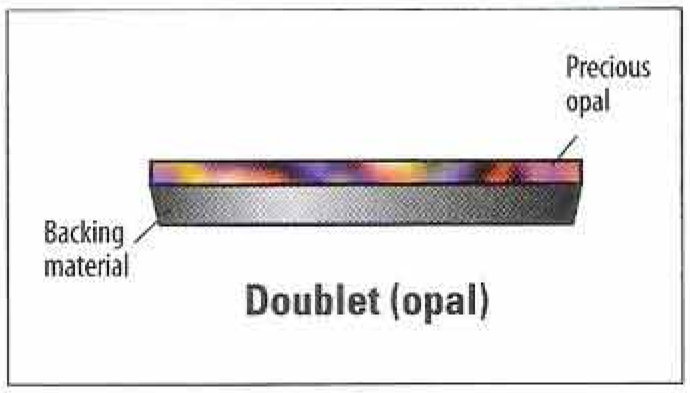
Dichroism The tendency for some *doubly refractive* stones to exhibit different *body colors* when seen from different directions. Iolite is a dichroic stone.

Diffusion treatment Heating a cut gemstone (often a corundum, such as ruby or sapphire) at high temperatures in the presence of chemicals so that the chemicals are absorbed into the surface of the stone, usually altering its color.

Because the coloration is shallow, it can be removed during recutting and will be revealed if the stone is chipped or broken. All *treatments* should be disclosed to the buyer.

Dispersion The rainbow effect that's visible when white light goes through a prism, bending and breaking into the colors of the spectrum. Occurs in strongly *refractive* gemstones, such as diamond. The amount of dispersion that's visible is affected by the angles of the cuts.

Double refraction The ability of a *gem material* to break a single light ray into two when the light enters the stone.



Doublet (opal)

Doublets *Gem materials* composed of two parts. The two parts may be made of the same material (for example, colorless beryl) joined by a colored epoxy. Or they may be made of two different materials (such as glass and garnet, or opal with a chalcedony backing) that are fused or epoxied together.

Doublets, such as glass/garnet doublets, may be meant to imitate other gemstones. As with opal or turquoise doublets, a backing may be applied to reinforce and strengthen weak or thin gemstones.

Durability The ability of a *gem material* to withstand wear. Durability is a combination of the gemstone's *hardness* (resistance to scratching), *toughness* (resistance to breakage), and, to some extent, its cut (gemstones cut with sharp edges or points are more susceptible to damage during wear and improper storage). A gemstone can be hard but brittle (topaz) or soft but tough (jade).

Enhancement (or treatment) Treating a *gem material* by any number of methods (other than cutting) to improve its color, clarity, or *durability*. Gem materials can be treated by *heating*, irradiation, dyeing, coating, plastic impregnation, *filling*, and *oiling*, among other methods. All enhancements should be disclosed to the buyer.

Facets Small flat surfaces cut onto a gemstone to create sparkle and emphasize *brilliance*.

Filled gems *Gem materials* that have been treated by having their surface-reaching *fractures* or surface cavities filled with a secondary material, such as glass.

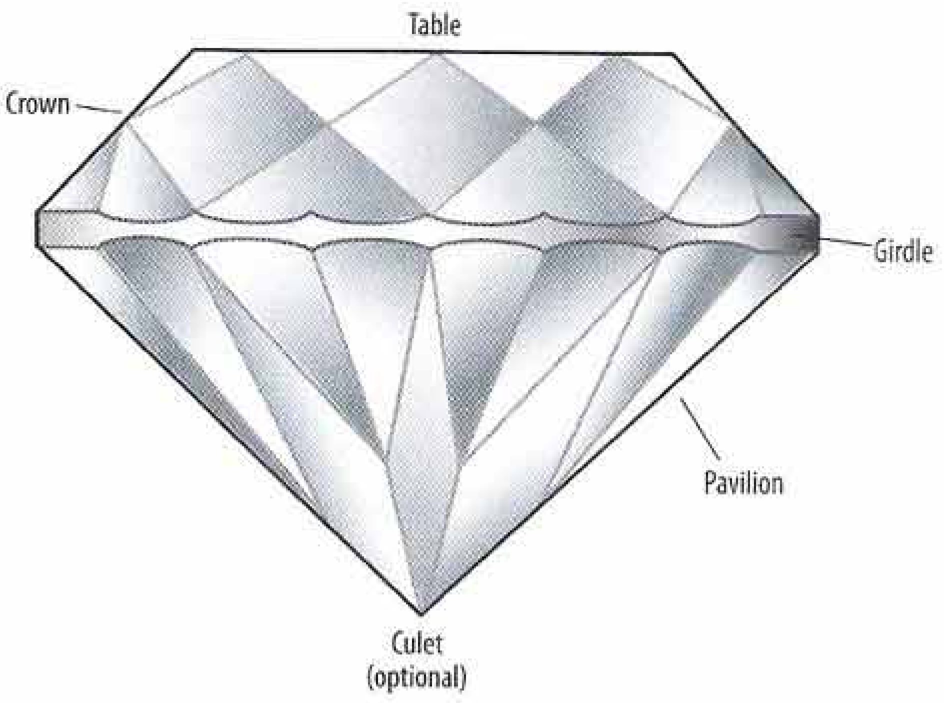
This not only hides the *blemish* but also may be used to add color and sometimes weight to a stone. All *treatments* should be disclosed to the buyer, and treated stones should be priced accordingly.

Fracture An uneven break within or on the surface of a stone.

Gem material Anything used as a decorative stone in jewelry, including *imitations*, *synthetics*, and *natural* gemstones.

Gemstone A *natural* rock, *mineral*, or *organic* material that possesses the beauty (color and/or transparency), *durability*, and rarity to be valued as a jewelry material.

Girdle The center, waist, or dividing line between the top (*crown*) and bottom (*pavilion*) of a *faceted* stone. May be smooth or faceted, polished or unpolished. (See "Anatomy of a Gemstone," *opposite, top.*)



Anatomy of a Gemstone

"Labradorescence" is derived from labradorite feldspar, the stone in which it is most commonly seen.

Hardness ▨ A *gem material's* resistance to scratching. A gemstone (for example, topaz) may be hard (resistant to being scratched by other materials) but brittle (easily broken by a blow).

Heat treatment The processing of cut or rough gemstones at high temperatures to improve clarity, color, or both.

Heat treatment (without the use of added chemicals, unlike in *diffusion treatment*) usually penetrates the stone and is stable. It is usually considered an acceptable *enhancement*, as long as it's properly disclosed to a buyer at both the wholesale and retail level.

Imitation A *gem material* that looks similar to and is used in place of another, usually more expensive or less *durable*, gem material.

Imitations can be glass or plastic, *doublets*, *synthetics* (synthetic spinel, for example, can be used to imitate aquamarine), or other man-made materials (such as cubic zirconia).

Imitations may also be *natural* materials used in place of another natural material. (Colorless zircon or colorless sapphire, for example, may imitate diamond.)

Inclusion Any foreign substance or growth characteristic inside a *mineral* that is visible, either to the unaided eye or with magnification. Inclusions include solids (such as crystals), needles (which can be fine crystals or hollow growth tubes), gases, liquids, *fractures* (irregular internal breaks), and *cleavages* (breaks along the crystal planes).

Intaglio A type of gem carving in which the design or image is cut into the stone so that it is below the surface of the stone; the opposite of a *cameo*. Intaglio-cut stones have been used as personal seals.

Interference Occurs when waves of light traveling slightly out of step with each other converge, so some wavelengths and the colors they represent are intensified while others are canceled out.

Iridescence A *phenomenon* caused by *interference*.

Key color The color used to evaluate most faceted stones. Key color (as opposed to *body color*) takes into consideration the gem's brilliance; it is best judged by viewing the stone from the *table*-up position.

Labradorescence The *iridescence* most commonly seen in labradorite feldspar; caused by *interference* of light when it is reflected from the stone's thin layers, which are created by repeated twinning of the *mineral* during growth.

Luster The quality of a gemstone's surface finish, which determines the quality of the light that reflects from it. There are several types of luster, including vitreous, greasy, adamantine, and sub-adamantine. The luster of soft stones can be dulled by wear. Not all materials will polish to a very high luster.

Mineral An earth-building material made up of only one substance (for example, aluminum oxide is the chemical constituent of corundum [ruby and sapphire]). Most, but not all, gemstones are rare, high-quality examples of minerals.

online extra

To download a free PDF of the Mohs scale of hardness, visit www.artjewelrymag.com/reference.

Natural A *gem material* that is found in nature; not man-made. Natural gemstones may be treated by a variety of methods to alter their color or clarity, but they are still not considered man-made. (These stones are described as "*enhanced*" or "treated.")

"Natural" is also a term that is applied to a type of diamond *blemish*; it's a remnant of the original "skin" or surface of the rough diamond crystal.

Oiling A type of *treatment*, commonly performed on emeralds, in which oil is forced under pressure into surface-reaching *fractures* in order to conceal them. Oiling is not stable; the oil can leach from the fractures.

Because it is a common and longstanding treatment, it is sometimes said to be acceptable. It is being replaced by other, stable methods of fracture filling. All treatments should be disclosed to a buyer.

Opaque Materials that do not allow light to pass through them (for example, lapis lazuli).

Organic gem A *gem material* that has been formed by living processes. Amber (fossilized tree resin), pearls (produced by oysters), coral (bony structures produced by living animals), and jet (hard coal, produced from once-living plants) are all organic gem materials. Organic gem materials are usually soft (not resistant to scratching) and can be damaged easily by heat or acids.

Pavilion The bottom or back side of a *faceted* gem; usually faces toward the body during wear. (See "Anatomy of a Gemstone," *page* 81.)

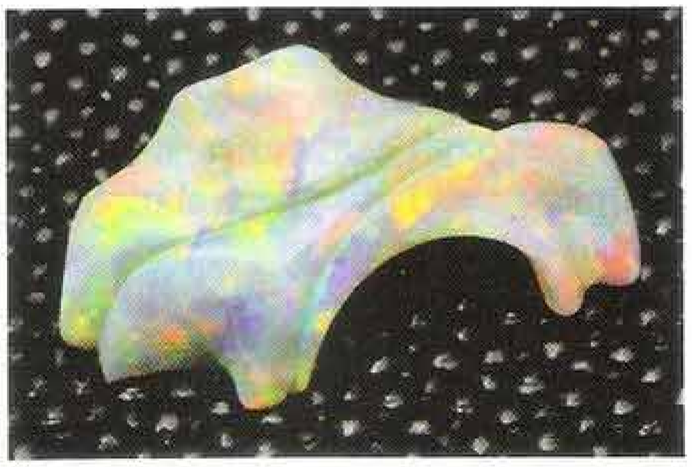
Phenomenon A gemstone property that is a function of the way light interacts with the *inclusions* in a gemstone or with the atomic structure of the gemstone. Gemstone phenomena include *adularescence, asterism, aventurescence* or *schiller, chatoyancy, color change, labradorescence,* and *play-of-color.*

Play-of-color The *phenomenon* exhibited by opal. Play-of-color is a combination of diffraction (light bending and breaking into spectral colors as it passes between the spheres of silica that make up the opal's structure) and *interference.* Although the term is sometimes used to describe the phenomenal colors in other gemstones, gemologists usually reserve the term "play-of-color" for opals.

Pleochroism The tendency for a gemstone to show different colors depending on the direction from which the stone is viewed. The term means "many colored."

Pleochroic gemstones may be either *dichroic* (two colored) or trichroic (three colored). Dichroic stones include iolite and andalusite; tanzanite is a trichroic stone. In

Amber, which is fossilized tree resin, and pearls, which are produced by oysters, are two types of organic gems.



"Play-of-color" is usually reserved for describing the flash in opals. Photo courtesy of Lightning Ridge Opals, Inc.

Iolite is a dichroic gemstone; it exhibits different colors when seen from different directions. Gem courtesy of John Dyer & Co.

Synthetic stones (here, sapphires and rubies) are man-made imitations of naturally occurring gems.

order to be pleochroic, a stone must be *doubly refractive*.

Reconstructed *Gem materials* that have been fabricated by pressing the dust of *natural* material together with plastic or epoxy; most commonly done with gemstones such as turquoise or coral. Although reconstructed stones are made from natural gemstones, they are considered *imitations* because of their high plastic or epoxy content.

Reflection The return of light from the surfaces of a gemstone. Reflection does not take place only on exterior surfaces; light that passes into a gemstone can be reflected from the internal surfaces back through the stone and out its *crown* (see "Anatomy of a Gemstone," *page 81*).

Refraction The slowing and bending of light as it passes from the air into a *translucent* or *transparent* material, such as a gemstone. In *singly refractive* stones, light entering the stone remains in a single ray. In *doubly refractive* stones, a ray of light is split into two. Each ray is bent and slowed to a different degree.

Refractive index (RI) A measure of how much light slows and bends when it enters a material, such as a gemstone. A property unique to every *gem material*; used to aid in identification.

Trichroic stones, such as tanzanite, can show three different colors depending on the viewing angle. Gem courtesy of John Dyer & Co.

Schiller See *aventurescence*.

Scintillation Flashes of white light from the surfaces of gemstone *facets* as the stone is moved. Whether and how much a stone scintillates depends on the stone's size and number of facets, the quality of the polish on the stone, and the gemstone's *refractive index*.

Single refraction The tendency of a *gem material* to maintain light in a single ray as it passes from air into the gemstone.

Specific gravity (SG) A stone's density; its weight when compared to an equal volume of water.

Synthetic A man-made *gem material* whose physical and optical properties (*refractive index*, *specific gravity*, *hardness*, etc.) match the physical and optical properties of a *natural* gem material exactly, or as closely as technologically possible.

Synthetics (such as synthetic spinel, synthetic sapphire, synthetic diamond) have a natural gemstone counterpart. Gem materials such as moissonite and cubic zirconia, which have no natural gemstone counterpart, are considered man-made *imitations*.

Table The flat top of a *faceted* stone; the largest facet. (See "Anatomy of a Gemstone," *page 81*.)

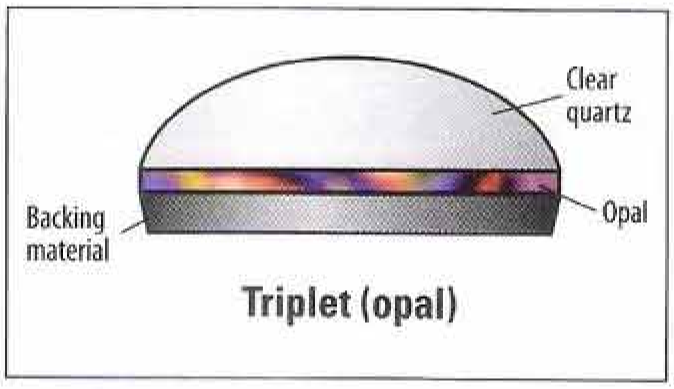
Toughness A *gem material*'s resistance to breakage. A stone may be relatively soft and easily scratched but very difficult to break. Jade is a very tough stone.

Translucent The ability of a material to allow light to pass through it but with some distortion or diffusion. Most agates are translucent, as is fine jade.

Transparent The tendency of a material to allow light to pass through undistorted.

Treatment See *enhancement*.

Trichroism The property of a *doubly refractive* gemstone to appear to be three different colors depending on which angle the gemstone is viewed from. Tanzanite is trichroic.



Triplets *Gem materials* made from three different components. The most common jewelry triplets are opal triplets, composed of a *natural* or chalcedony backing, a thin slice of opal, and a quartz top. Opal triplets are made to strengthen and protect a delicate slice of opal. Triplets can also be used to *imitate* more expensive stones.

Want to find out more about gemstones? Check out our new column, Stone Sense, *page 27*. In this issue, we're talking about amethyst, citrine, and ametrine.

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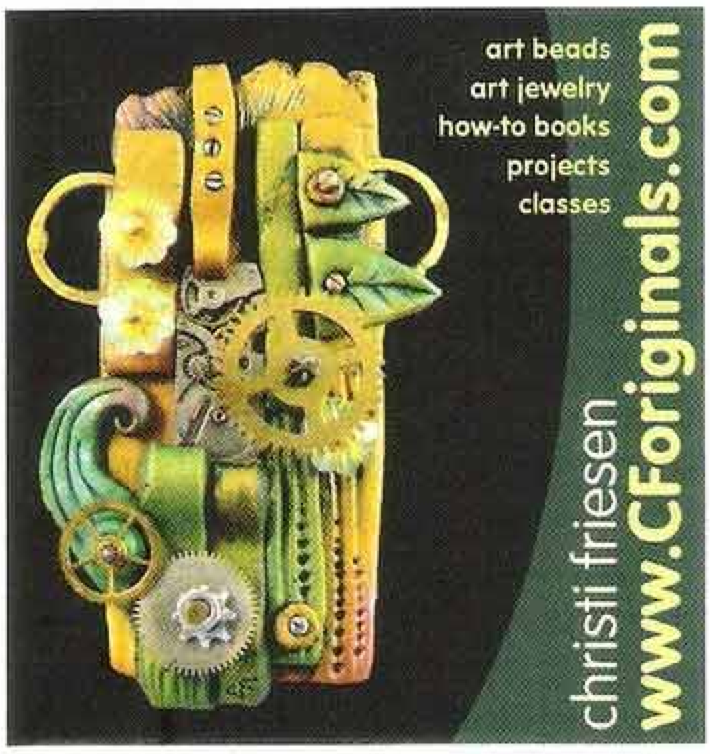
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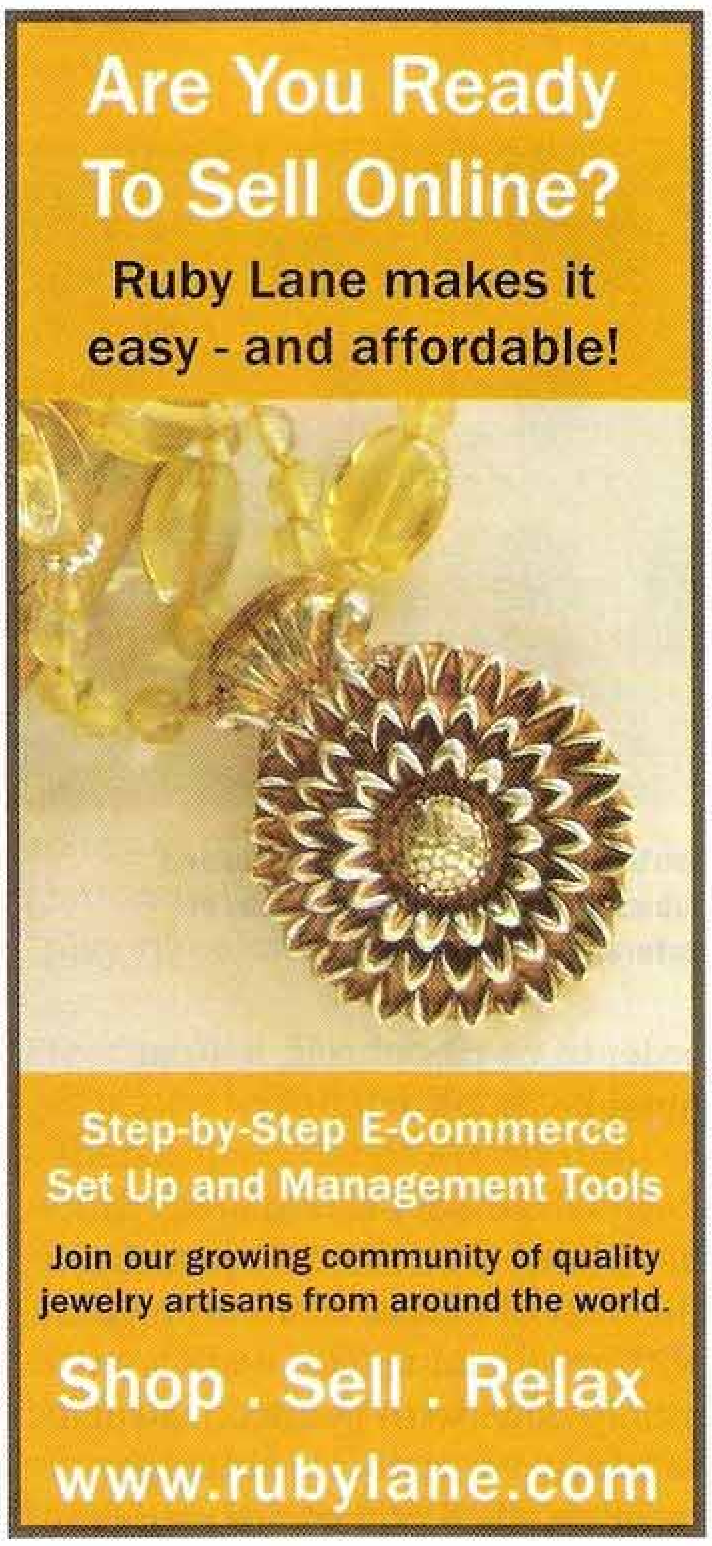
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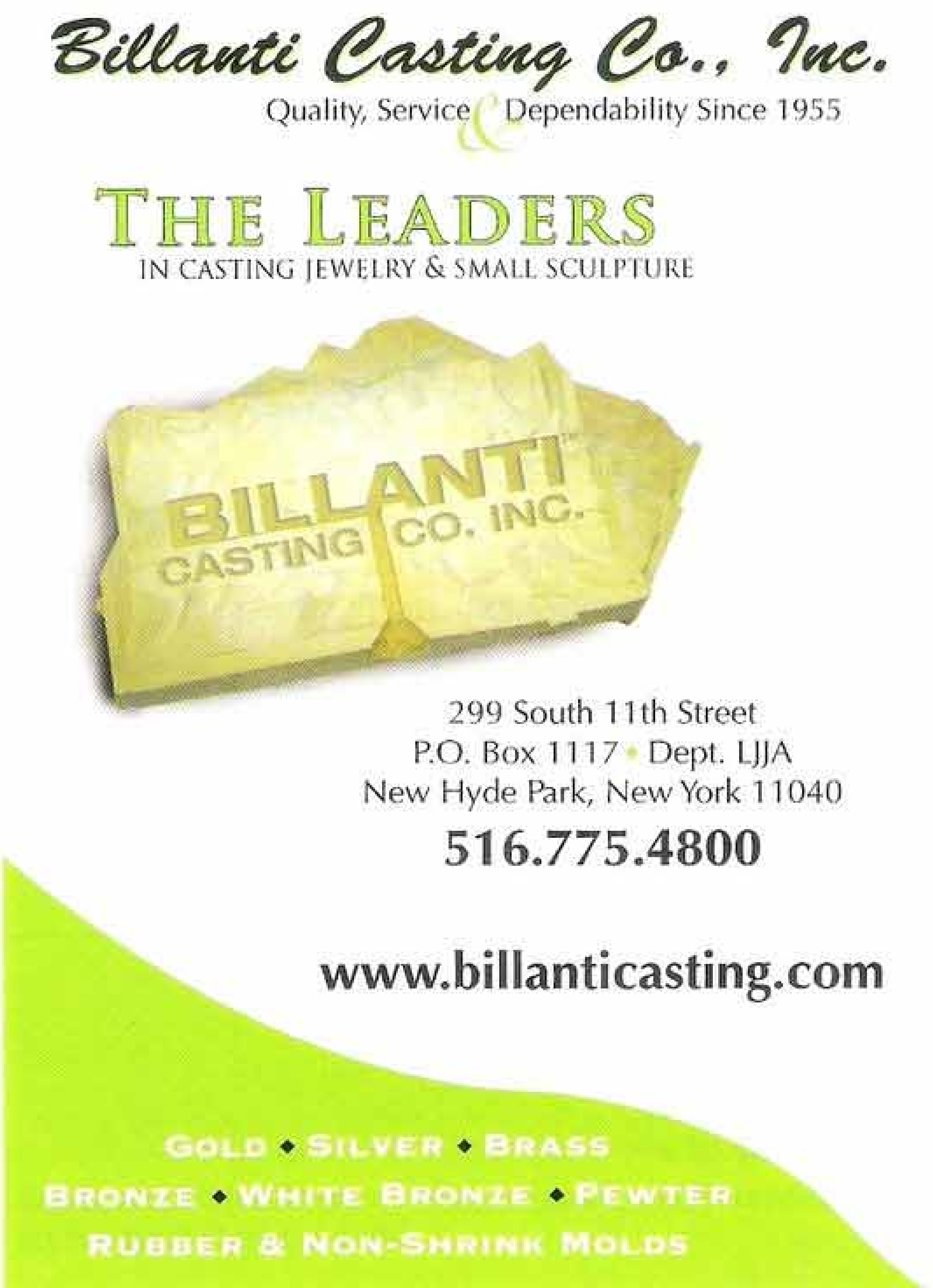
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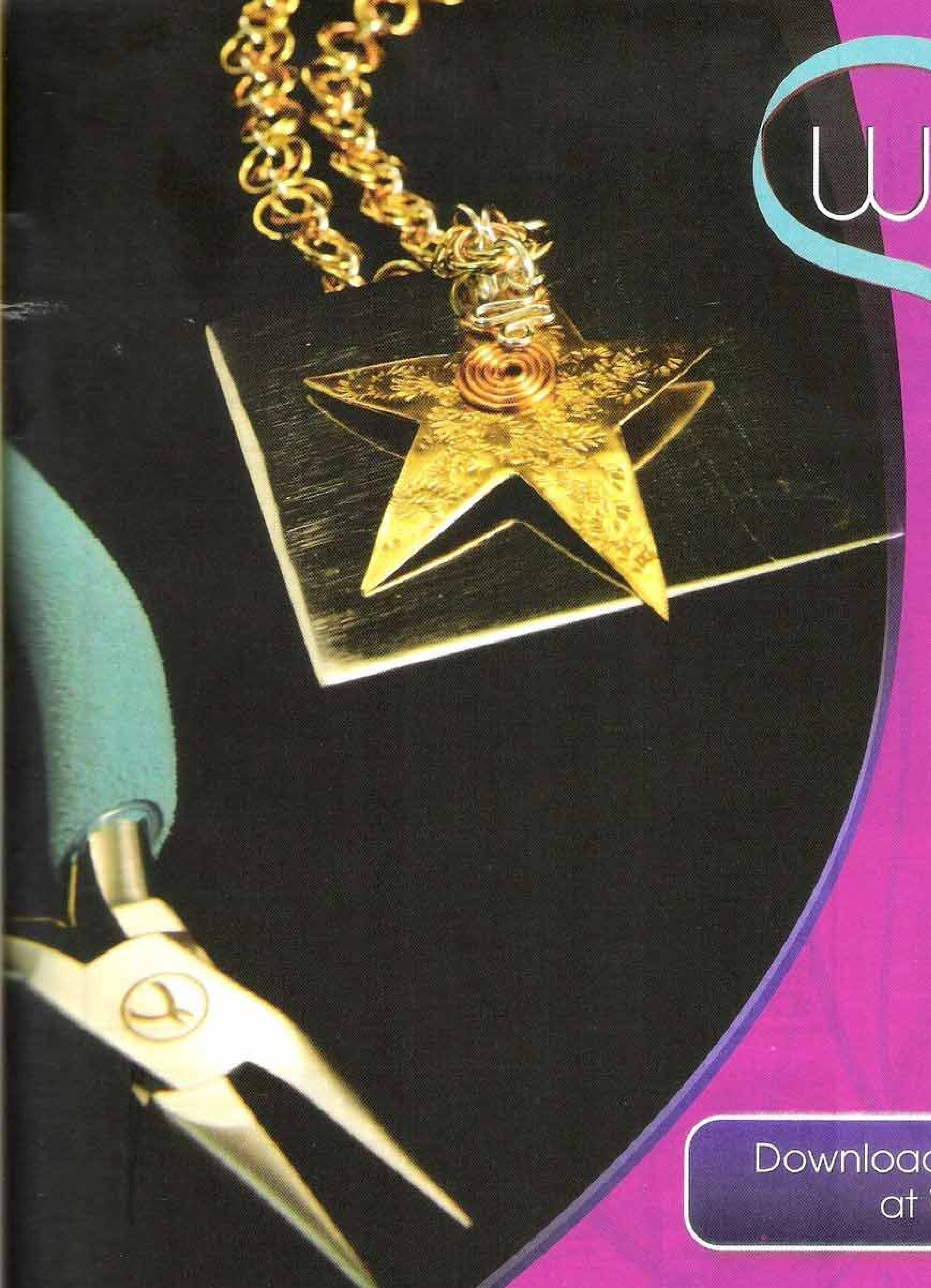

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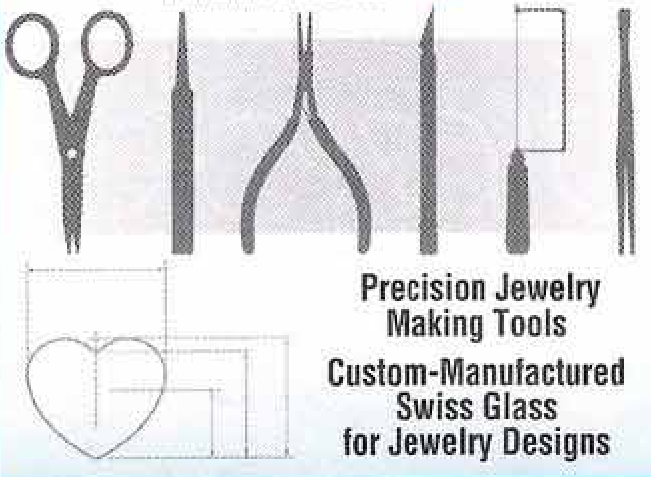

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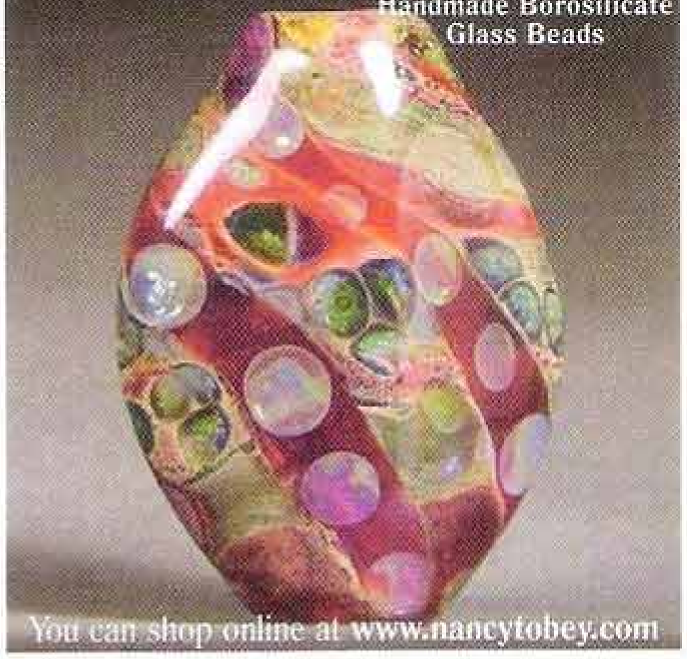

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basic techniques

demonstrations and definitions of beginning jewelry-making techniques needed for projects in this issue

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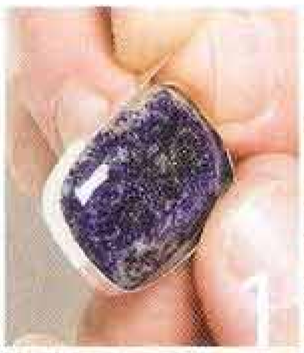
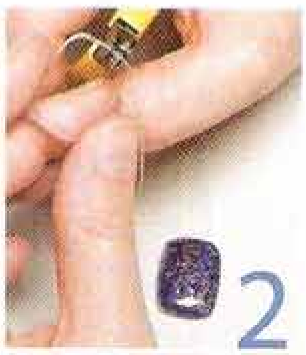
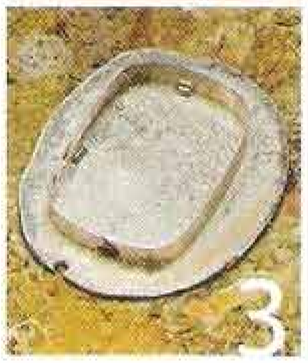
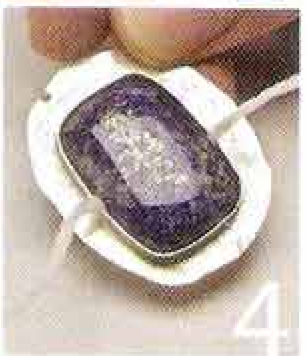
metalworking techniques

MAKING A BEZEL CUP AND BEZEL-SETTING A STONE









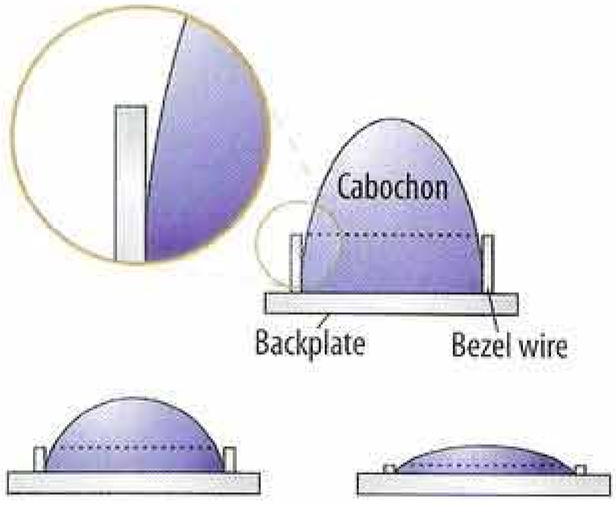
Use bezel wire to tightly encircle the edge of a cabochon, allowing the ends of the bezel wire to overlap [1]. Use flush cutters to cut through the bezel wire where it overlaps [2]. Bring the ends of the bezel wire together with no gaps, and place the bezel wire on a soldering pad. Flux the bezel wire, place a small pallion of hard solder on the join, and then heat the entire bezel wire with a soft, bushy flame until the solder flows. Remove the heat, then quench the bezel in water. Soak the bezel in pickle, then rinse and dry it. Test the fit of your bezel by pushing the cabochon through the bezel from either side; the fit should be very snug. If the bezel is too large, cut the seam (removing the old solder), and resolder. If the bezel is too small, stretch the bezel wire on a mandrel, or start over.

Solder the bezel to a backplate by fluxing both parts and placing the solder pallions so that they touch both surfaces [3]. Heat the backplate with a soft, bushy flame until the solder melts, then quench the bezel cup in water. If the entire bezel is not soldered to the backplate, pickle it to remove any flux residues, rinse and dry the bezel cup, and then resolder.

Press the cabochon into the bezel with a piece of thread or dental floss behind it to test the fit [4]. The walls of the bezel cup should extend up just beyond the point at which the stone begins to curve inward (see illustration, *below right*); if your bezel is taller than that, it will overshadow your stone; if your bezel is shorter than that, it may not hold your stone securely. A general guideline is that the bezel should be about one-third as tall as the stone. If the bezel is too tall, use the floss or thread to pop the cab out of the bezel. Reduce the height of the bezel by sanding it face down in a figure-8 motion on a piece of sandpaper placed on a flat surface.

Use a jeweler's saw with a 2/0 blade to trim the excess backplate. File the remaining backplate as close to the bezel wall as desired.

Place the cabochon in the bezel. View the bezel like the face of a clock, and, using a burnisher or bezel rocker, gently push the bezel down onto the stone, first at 12:00, then in opposition at 6:00. Repeat at the 3:00 and 9:00 positions. Work around the stone, pushing the bezel down with opposing moves to keep the stone centered and to keep the bezel from getting pleated. Smooth the pushed bezel with the burnisher by rubbing around the outer edges with a consistent pressure. Place masking tape over the stone to protect it, and use a pink rubber wheel in a flex shaft to polish the bezel.



The bezel will be secure enough to hold the stone if you position it where the stone starts to curve in.

SOLDERING

Clean the metal you plan to solder by sanding it with 400-grit sandpaper. Surfaces must be clean and in complete contact with each other for solder to flow; solder will not fill holes or gaps. Flux all the metal you plan to solder to prevent oxidation and to help solder flow. Heat the entire piece, not just the solder, keeping the torch moving in a circular motion.

If there is more than one solder join in a piece, solder the first one using hard solder, the second using medium solder, and the third using easy solder, as hard solder has the highest melting point and easy solder has the lowest. To keep the solder in a previous join or joins from flowing when you heat the metal again, apply an anti-flux to those areas.

During soldering, the solder will flow to where the heat is the greatest. If your solder is flowing in the wrong direction, adjust the direction of your flame.

Once the solder flows, quench the piece in water, and place it in a pickle solution to remove oxidation and flux residue. Rinse the piece in clean water.

TUMBLE-POLISHING

Place steel shot into the tumbler's barrel. Although you can use any shape of steel shot, a combination of shapes works best; the various shapes polish crevices and contours differently, ensuring an even polish.

Pour in water to cover the shot, then add a pinch of burnishing compound. Place your jewelry in the tumbler and seal the barrel. Turn on the tumbler, and let it run for 2–3 hours or more. Pour the contents of the tumbler into a sieve over a sink, and rinse. Remove your jewelry and dry it. Dry the shot before storing it.

wireworking technique

OPENING AND CLOSING A JUMP RING

Hold the jump ring with two pairs of chainnose pliers. To open the jump ring, bring one pair of pliers toward you and push the other pair away from you. Reverse the steps to close the jump ring.

metal clay technique

ROLLING METAL CLAY

Metal clay dries rapidly, so remove only the amount you will use during a given work session. Store unused clay in an airtight container with a small piece of moist sponge or paper towel. Cover clay with plastic wrap while you are not working with it. Use a spray bottle to remoisten the clay if it begins to dry out.

Apply olive oil or natural hand balm to your hands, tools, and work surface to prevent the clay from sticking. Decide how thick you want your metal clay sheet to be. Make two stacks of either playing cards, mat board, or thickness guides that equal that thickness. Place your lump of clay on your work surface between the two even stacks. Roll the clay out to a uniform thickness, using an acrylic roller or PVC tube. Rotate the clay 90° and roll it again.

toolboxes

Bezel-setting

- Bezel pusher or rocker
- Burnisher
- Dental floss
- Double-sided tape
- Loupe or Optivisor
- Painter's tape

Bronze clay

- Acid-free activated carbon
- Kiln-safe stainless steel container with lid
- Kiln stilts
- Programmable kiln

Chain mail

- Awl or scribe
- Needle files
- Pliers (2 pairs): bentnose, chainnose, or flatnose
- Reading/magnifying glasses
- Shock-absorbing surface (bead mat or towel)
- Tumbler, steel shot, burnishing compound

Finishing

- Brass brush
- Copper tongs
- Files: hand, needle
- Flex shaft or buffing wheel, buffs, polishing compound
- Liver of sulfur or other patina, lidded glass container
- Microcrystalline wax
- Polishing cloth
- Polishing papers
- Sandpaper: various grits
- Scouring pad
- Steel burnisher
- Steel wool
- Tumbler, steel shot, burnishing compound
- Ultrasonic cleaner

Metal clay

- Acrylic or PVC roller
- Airtight storage container
- Brass brush
- Burnisher
- Clear, hard plastic sheet
- Craft knife
- Drinking straw
- Fine-tip paintbrush
- Flexible Teflon sheet
- Kiln, kiln shelf
- Mug warmer
- Needle files
- Needle tool
- Olive oil or natural hand balm
- Pin vise or holder, drill bits
- Plastic wrap
- Playing cards or thickness gauge
- Rubber block
- Shape cutters
- Smoothing tool
- Spatula or palette knife
- Syringe
- Texture sheets or molds
- Tissue blade: flexible, rigid, or wavy
- Tumbler, steel shot, burnishing compound
- Vermiculite, kiln-safe container
- Water: distilled
- Wet/dry sandpaper: various grits, or nail buff/emery board

Resin

- Clear packing tape
- Craft sticks
- Disposable plastic medicine cups (for mixing and measuring)
- Flex shaft, polishing buffs
- Latex or nitrile gloves
- Needle tool
- Respirator mask
- Sandpaper: various grits
- Syringe or bottle with syringe tip
- Toothpicks
- Tweezers

Sawing/piercing

- Adhesive bandages
- Alligator tape (optional)
- Bench pin
- Center punch: manual or automatic
- Dividers
- Files: hand or needle
- Flex shaft, drill bits
- Jeweler's saw frame, saw blades
- Lubricant or beeswax
- Rubber cement or glue stick
- Safety glasses

Soldering

- Anti-flux
- Binding wire
- Borax (for borax solution)
- Copper tongs
- Fire-resistant surface: soldering pad, firebrick, or charcoal block
- Flux, flux brush
- Pickle pot with pickle
- Solder: hard, medium, and easy
- Soldering pick
- Sparker: manual or automatic
- Third hand, insulated cross-locking tweezers
- Torch, various tips

safety basics

Metal clay

- Use your kiln in a well-ventilated area to sinter clay.
- All tools should be dedicated for nonfood use.
- Follow manufacturers' instructions for programming your kiln and sintering times and temperatures.
- Do not torch-fire metal clay pieces that have a core inclusion, such as cork or wood clay.
- Do not sinter or torch-fire metal clay pieces that are not completely dry, as they may explode.

Metals

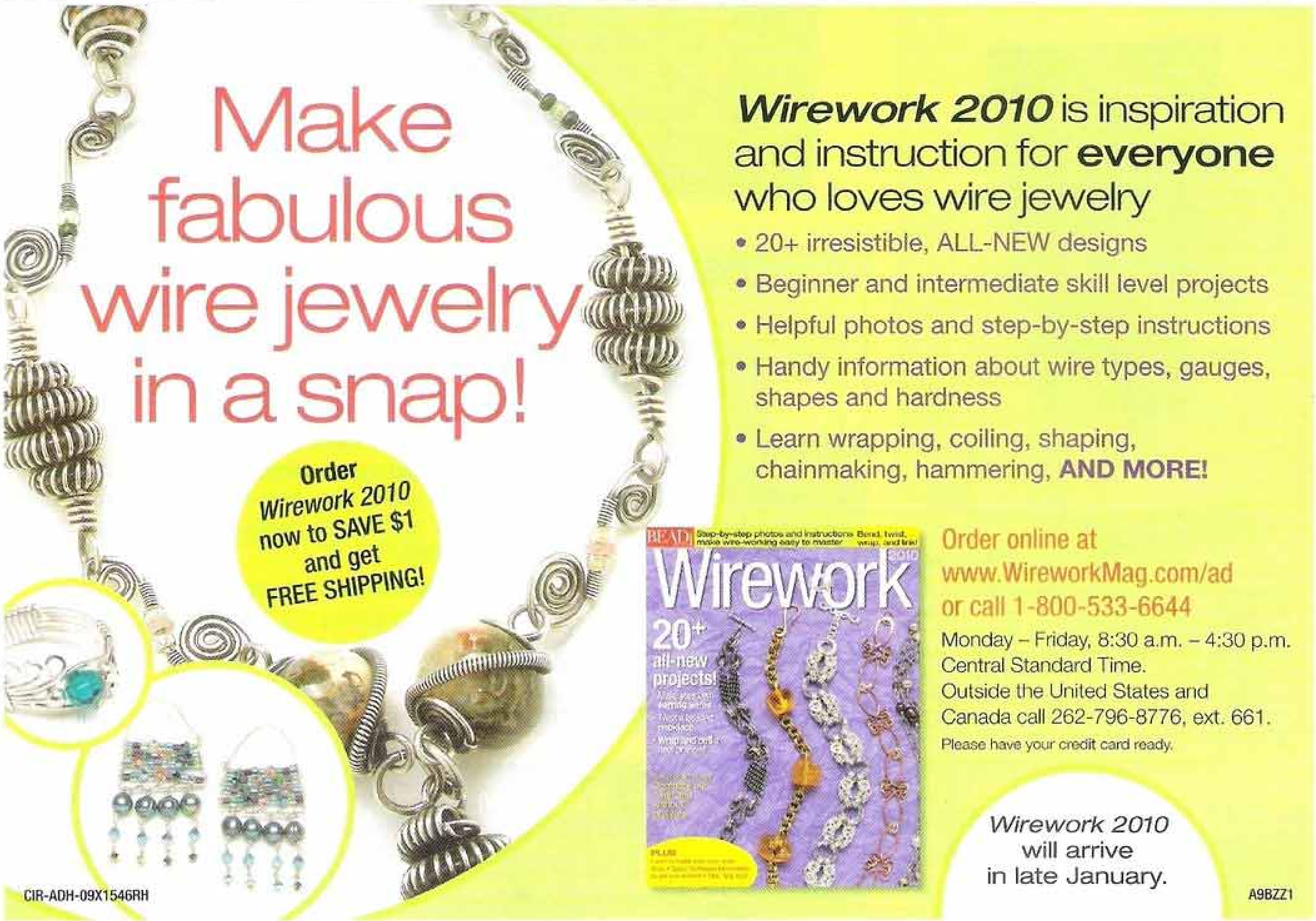
- Wear eye protection at all times while working with metals, wire, and metalsmithing tools.
- Wear a non-flammable apron to protect your clothing.
- Tie back long hair.
- Work in a well-ventilated area at all times.
- Wear close-toed shoes.
- Do not wear clothing or jewelry that might get caught in machinery or catch fire.

Resin

- Use resin in a well-ventilated area.
- Wear nitrile or latex gloves, and do not touch your eyes, nose, mouth, or other sensitive areas.
- Use tools dedicated for nonfood use.
- Consult your local hazardouswaste center for proper disposal methods.

All media

- Wear a dust mask while working with materials and tools that generate particulates.
- Read all Material Safety Data Sheets (MSDSs) before using a new material, and keep a copy of the MSDS for any material you use.
- Do not use tools or chemicals in ways that are contrary to the manufacturer's intended purpose.
- Wear protective gloves while handling caustic materials or chemicals.
- Keep a properly rated fire extinguisher and a source of clean water near your workstation.
- Keep cutting tools sharp and all tools and equipment properly maintained.



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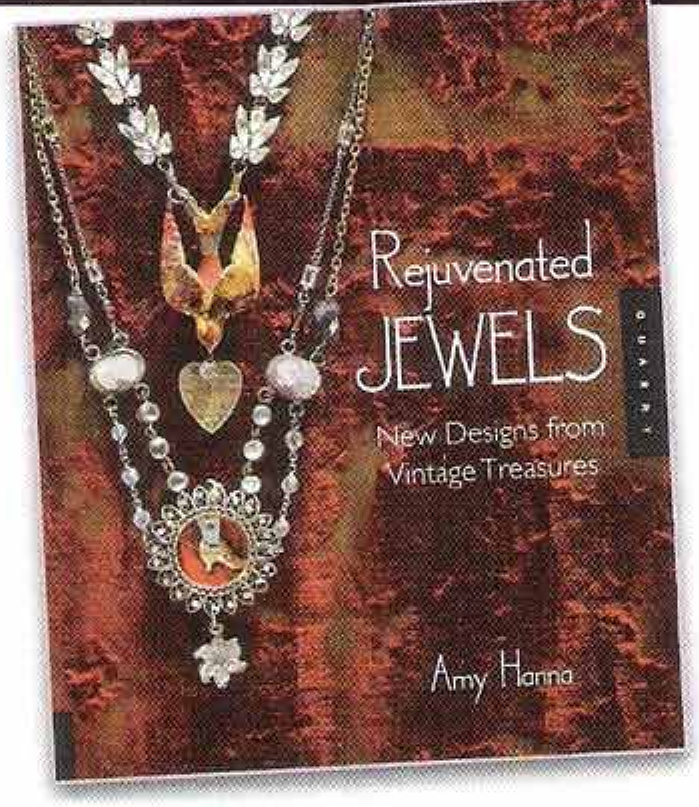

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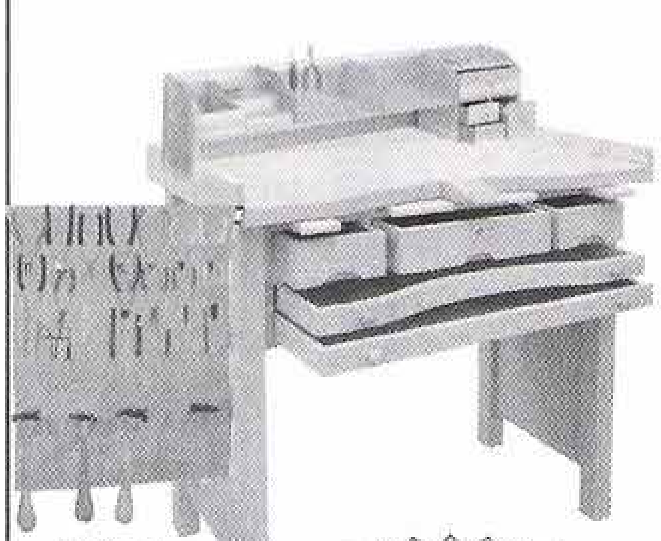

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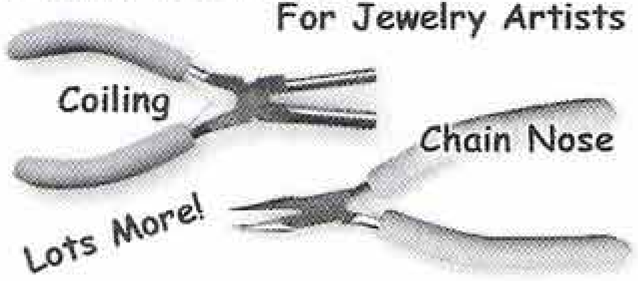

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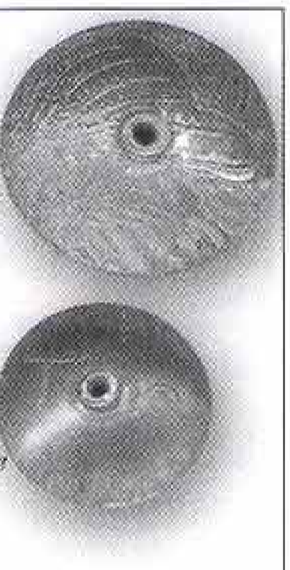

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contacts

When contacting artists and writers via e-mail, please put *"Art Jewelry"* in the subject line.

ARTIST PROFILE

pages 52–55

- *Joan Tenenbaum, www.joantenenbaum.com*

GALLERY

pages 47–51

- Linda Bernasconi, www.bernasconidesign.com
- Susan Chin, www.susanchin.com
- Jessica Dow and Mark Anderson, www.differentseasonsjewelry.com
- Jeff Fulkerson, jrocjeff@cox.net
- Jennifer Gierka, www.jennifergierka.com
- Velina Glass, www.velinaglass.com
- Wiwat Kamolpornwijit, www.kamolpornwijit.com
- David Liska, www.custombridaljewelry.net
- Lucila Nassau, lnassau@hotmail.com
- Tosca Hidalgo y Terán, www.nanopod.tv
- Niki Ulehla, nikiulehla@gmail.com

5 UNDER 10

pages 62–63

- Ruth Baillie, www.birdlandcreations.com
- Natasha Bouey, www.nbdesigns.etsy.com
- Lis-el Crowley, www.artandsoulct.com
- Alina Gridley, www.silvergarden.etsy.com
- Liz Hall, www.lizardsjewelry.com

BEYOND JEWELRY

page 98

- Martin Debenham, martin.debenham@freenet.co.uk

suppliers

SHAPE SILVER TUBING TO REPLICATE BAMBOO

pages 40–44

- Metals (Hoover & Strong, 800.759.9997, www.hooverandstrong.com)

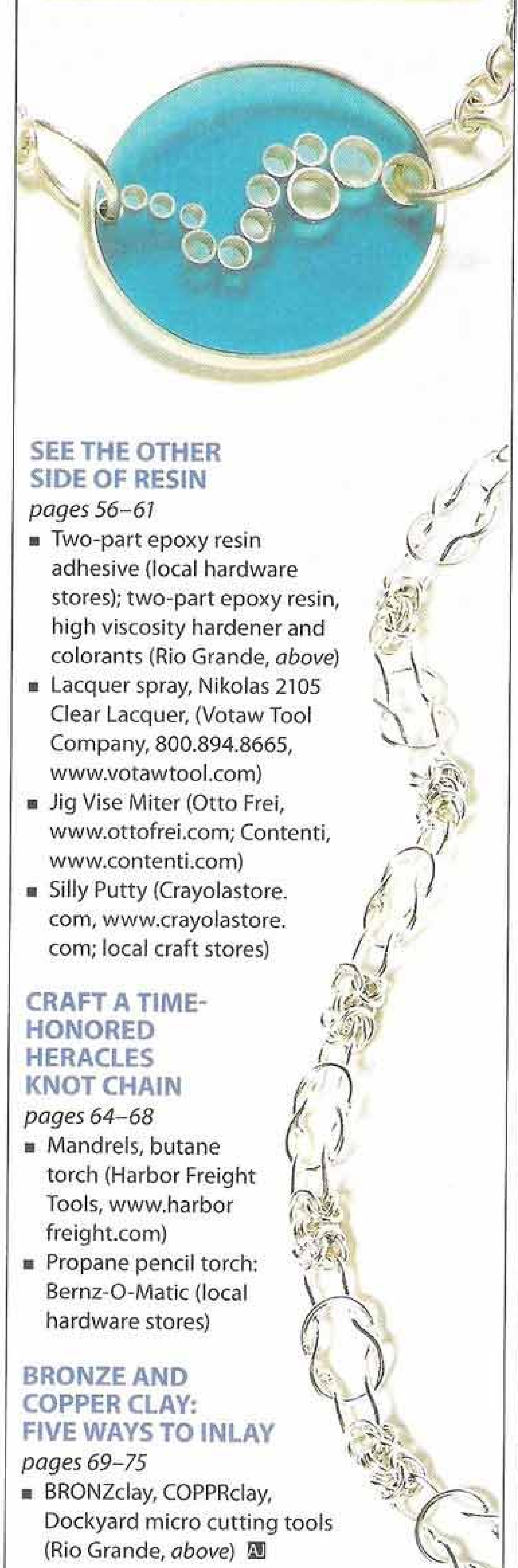
CUT YOUR STONE

pages 45–46

- Trim saw, combination lapidary machine (Inland Swap Top), polishing compound (Rio Grande, *above right*; Inland Craft Products, www.inlandlapidary.com)
- Dino bone rough (Escalante Rock Shop, www.escalanterockshop.com)

general supplier

- **Rio Grande:** 800.545.6566, www.riogrande.com



SEE THE OTHER SIDE OF RESIN

pages 56–61

- Two-part epoxy resin adhesive (local hardware stores); two-part epoxy resin, high viscosity hardener and colorants (Rio Grande, *above*)
- Lacquer spray, Nikolas 2105 Clear Lacquer, (Votaw Tool Company, 800.894.8665, www.votawtool.com)
- Jig Vise Miter (Otto Frei, www.ottofrei.com; Contenti, www.contenti.com)
- Silly Putty (Crayolastore.com, www.crayolastore.com; local craft stores)

CRAFT A TIME-HONORED HERACLES KNOT CHAIN

pages 64–68

- Mandrels, butane torch (Harbor Freight Tools, www.harborfreight.com)
- Propane pencil torch: Bernz-O-Matic (local hardware stores)

BRONZE AND COPPER CLAY: FIVE WAYS TO INLAY

pages 69–75

- BRONZclay, COPPRclay, Dockyard micro cutting tools (Rio Grande, *above*) AJ

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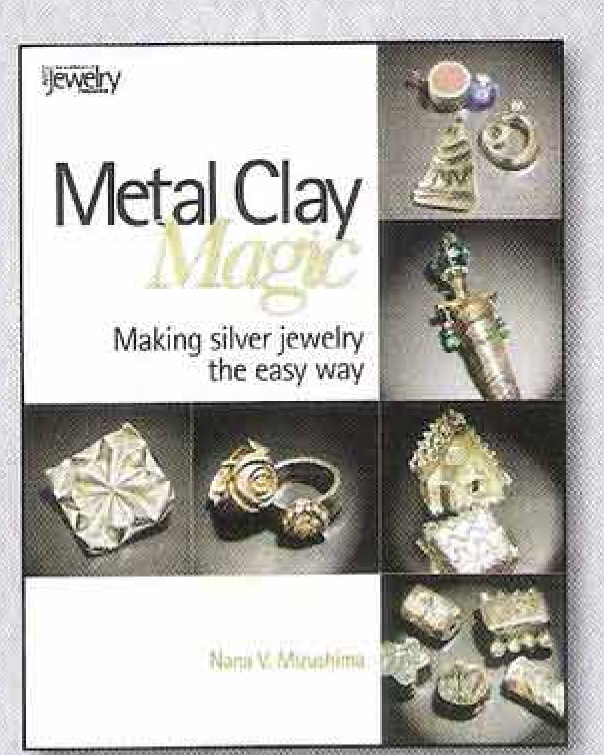
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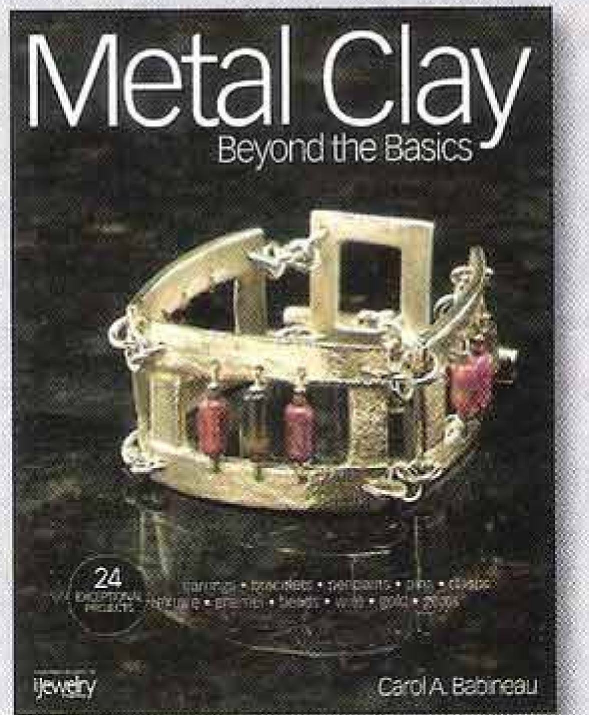
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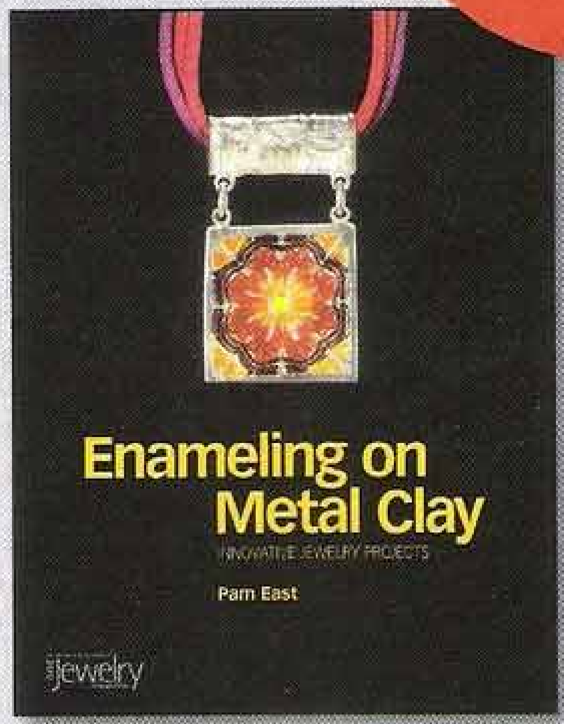
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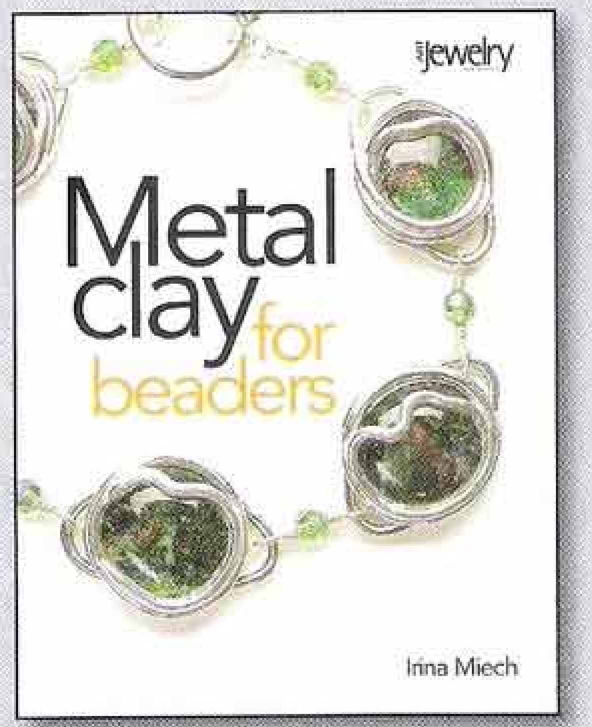
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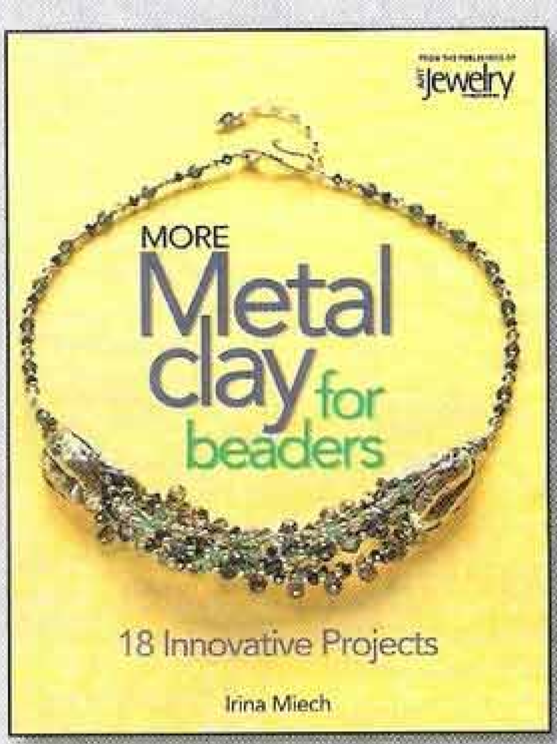
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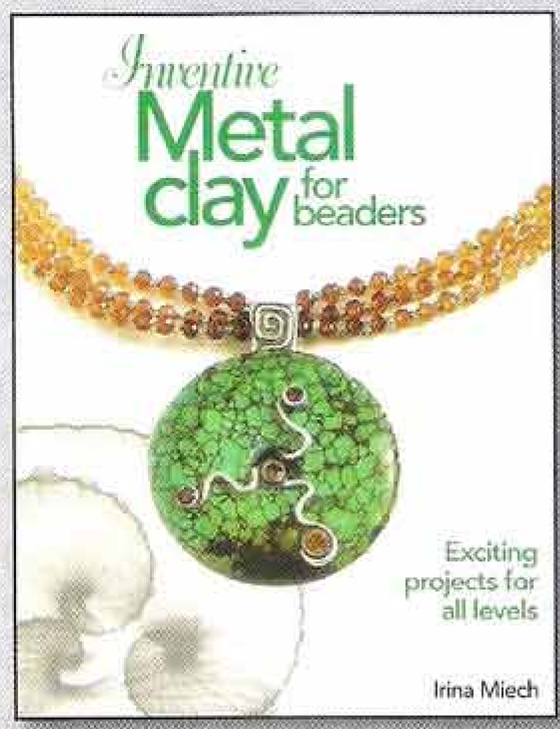
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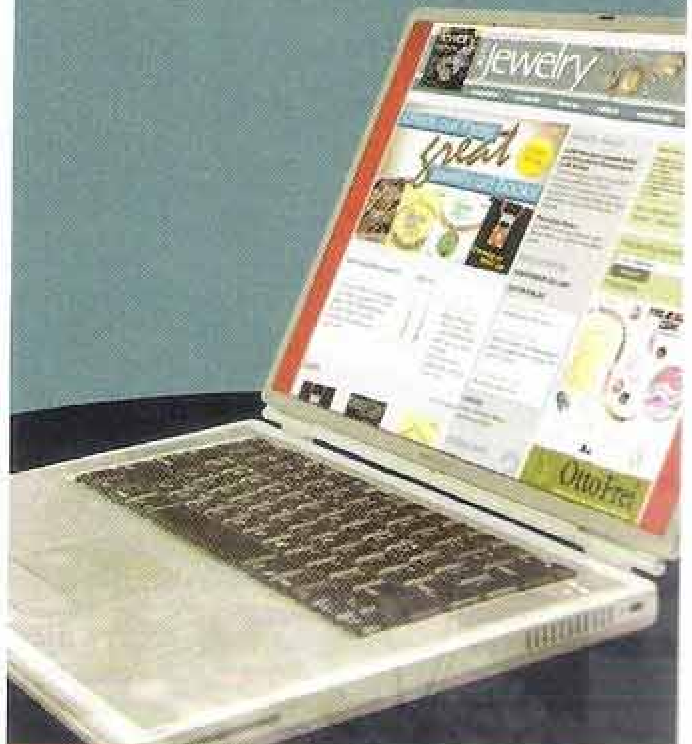

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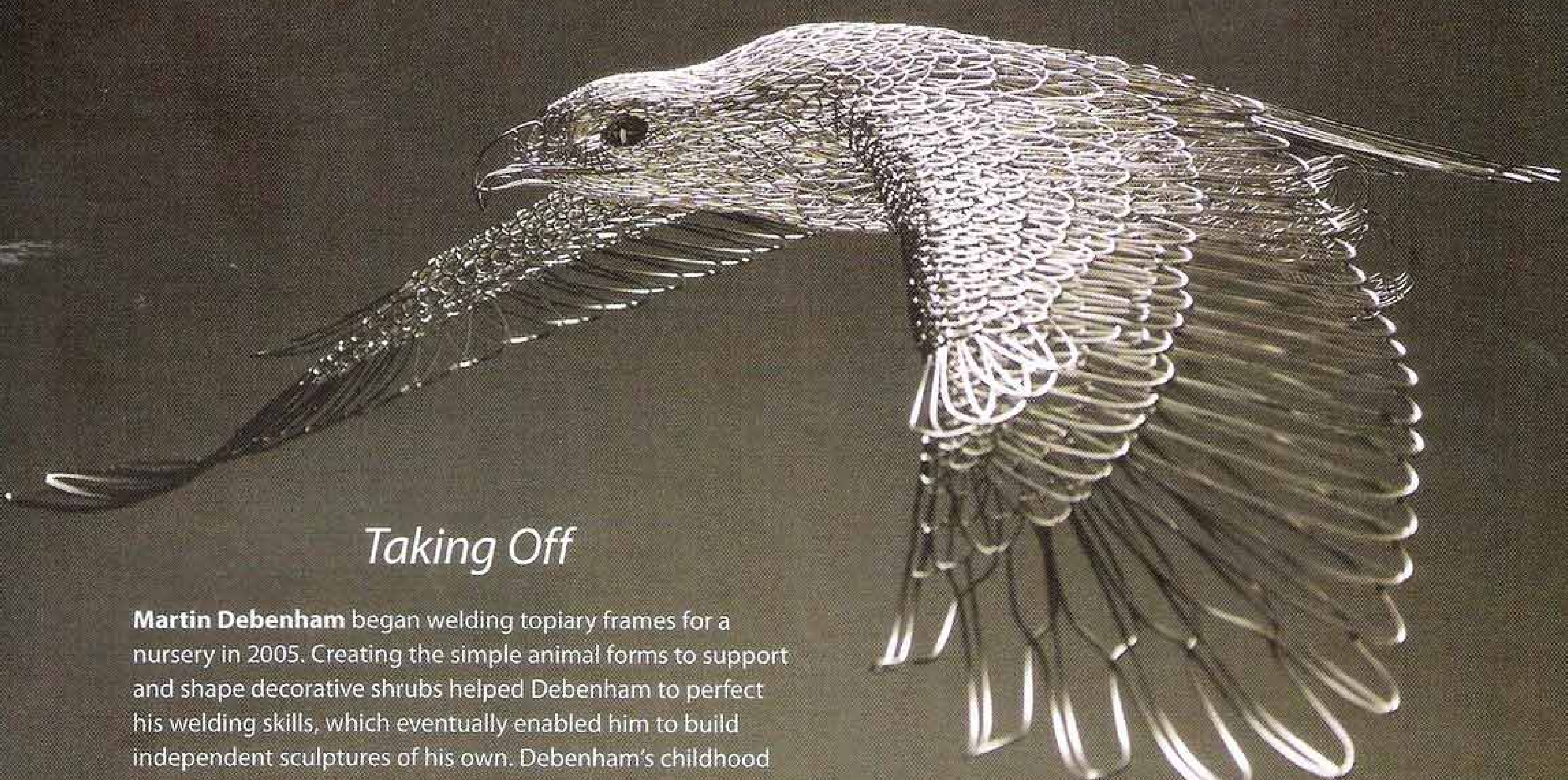

Taking Off

Martin Debenham began welding topiary frames for a nursery in 2005. Creating the simple animal forms to support and shape decorative shrubs helped Debenham to perfect his welding skills, which eventually enabled him to build independent sculptures of his own. Debenham's childhood love of eagles and other birds of prey inspired him to create this sculpture of a Golden Eagle. The sculpture's wingspan is nearly 8 ft. (2.4 m). What's perhaps more impressive: that's life-size for an average Golden Eagle.

The eagle, composed of individually cut and shaped stainless steel rods, was constructed in sections with the use of a Metal Inert Gas (MIG) welder. These sections were then fitted and welded together. To ensure that the feathers realistically overlapped, Debenham placed each weld join on the inside of the sculpture — not an easy feat, and one that proved a bit too tricky for the body. Instead, he constructed the body as a whole so that the wings and other parts could fit together accurately, starting at the beak and working through to the tail and feet. —*Addie Kidd*

at a glance

Title: Taking Off

Artist: Martin Debenham

Size: 235 x 117 x 60 cm
(92½ x 46 x 23½ in.)

Materials: Stainless steel: 2–4 mm rods, and sections of spheres for eyes

For more information:
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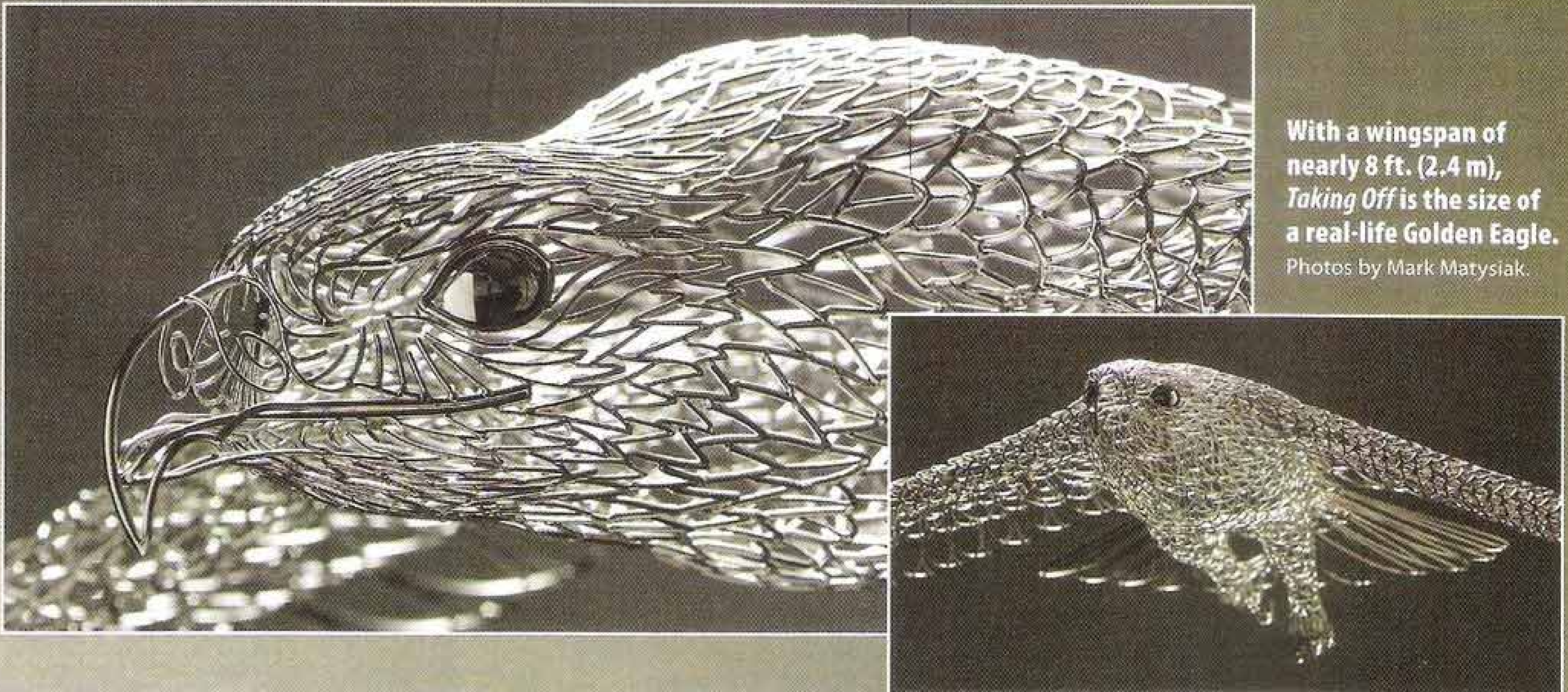

With a wingspan of nearly 8 ft. (2.4 m), *Taking Off* is the size of a real-life Golden Eagle.
Photos by Mark Matysiak.

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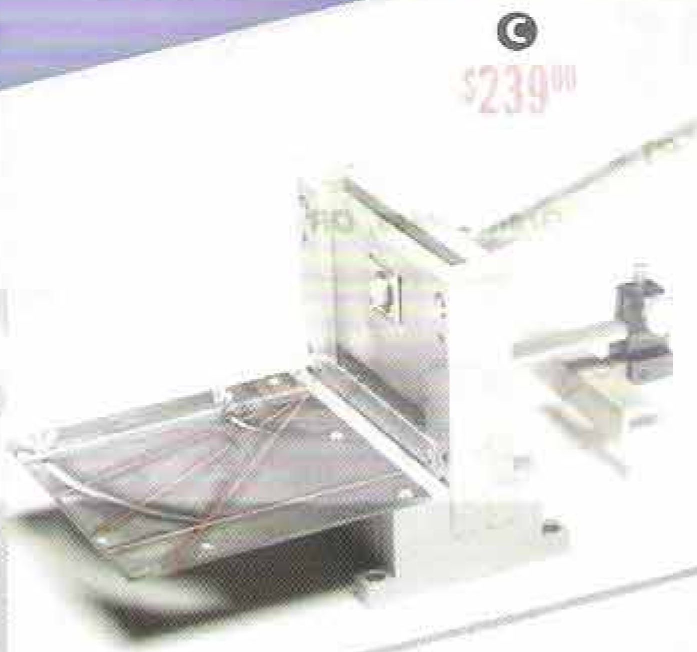

Ⓐ **ECONOMY ROLLING MILL** [Item 190-891] Surprisingly affordable, this mill is equipped with two 43 mm dia. flat, hardened steel rolls and two wire rolls, all 76 mm wide. Wire rolls have grooves from .75 to 4.3 mm wide. Has 4:1 gear reduction for easier operation. Includes a 1 year warranty. Ⓑ **TEXTURING HAMMERS** [Items 260-781, 260-782, & 260-783] Let your imagination run wild with this series of cleverly designed Texturing Hammers. Each one is double-sided, with a different design on each side. The range of decorative effects is endless. Each hammer is 10" long overall and is value-priced. Ⓒ **GUILLOTINE SHEAR** [Item 410-944] For cutting stock, neatly and exactly, up to 4" wide. Designed to cut mild nonferrous metals up to 2.4mm (10gauge) and mild steel up to 1.6mm thick (14 gauge). Blades are precision ground and hardened high carbon steel. Ⓓ **ECONOMY FLEXSHAFT MACHINE** [Item 236-971] With its powerful 1/8 HP motor and spring-reinforced sheath, our Economy Flexshaft is an outstanding value. The 1" diameter No. 30-style handpiece is equipped with a Jacobs-style chuck that accepts any bur, drill bit, or rotary tool with a shank up to 5/32" diameter. Operates at speeds up to 22,000 RPM, regulated by a carbon resistance foot rheostat. Shaft connection accepts any American-style (QD connection) handpiece. Furnished with fitted carrying case. Ⓔ **TUBE CUTTING JIG** [Item 400-135] Make straight cuts in tubing and wire using this cutting jig and your jeweler's sawframe. Stock is placed into the V-groove while the adjustable stop is set to the desired length (up to 13 cm). Adjustable stop is engraved with dimensions. Stock is secured with the pivoting thumb-clamp and your sawblade is inserted into the guide. For stock up to 6 mm diameter. Ⓕ **ECONOMY BENCH SHEARS** [Item 410-970: 4 3/4" blade, 410-971: 6" blade, 410-973: 8" blade] This series of powerful bench shears is designed for cutting sheet metal up to 1/4" thick or metal rod up to 7/8" diameter (max capacity depends on model). Long handles provide leverage for easy cutting. Available in 3 blade lengths: 4 3/4", 6", and 8". Ⓖ **JUMP RING MAKER** [Item 400-125] Produce jump rings quickly and easily with this time-saving device. Coil your wire around one of the twenty mandrels (diameters range from 2.5 to 12 mm) using the hand-winder. Once the coil is formed, place it in the adjustable coil holder and saw through it using the included rotary saw and handpiece guide. It's that easy! *Flexshaft machine with 1" diameter (No. 30 style) handpiece required (not included).* Ⓗ **ART CLAY SILVER** - Composed of silver powder, organic binders, and water, Art Clay Silver can be molded into any shape, including hollow beads and filigree objects. When fired in an oven or with a torch, the binders and water burn away, leaving a 99.9% pure silver object. Art Clay Silver is available in several forms including: clay, paste, paper, and syringe.

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